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CANADA BRICK QUARRY
SURFACE WATER SURVEY
SEVENTH ANNUAL REPORT 1988

Report No 88-266-K

E. Quarshie
Water Research Unit
Process Chemistry Section

ABSTRACT

Surface water monitoring of Mary Fix Creek was carried out on October 8, 1987, April 25 and August 31, 1988. In general most major constituents (calcium, bicarbonate alkalinity, sodium and chloride) levels increased at all four sampling locations. However, for the October 8, 1987, sampling period, boron and strontium (indicators of fly ash leachate) concentrations increased significantly at the South Property Fence (SPF). The increased levels of the indicators (boron and strontium) suggest that the creek water has been mixed or contaminated with leachate. Levels of suspended solids at the CP overpass decreased significantly in 1988 and trace metals generally conformed to the Provincial Surface Water Quality Objectives.

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31-238-892	837.71	December 14, 1988	88-266-K

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EXECUTIVE SUMMARY

CANADA BRICK QUARRY
SURFACE WATER SURVEY
SEVENTH ANNUAL REPORT 1988

E. Quarshie
Water Research Unit
Process Chemistry Section

Lakeview TGS fly ash disposal at the Canada Brick Quarry began in December 1981, in accordance with a Provisional Certificate of Approval issued by the Ontario Ministry of the Environment (MOE). One of the conditions in the Certificate of Approval was regular monitoring of the surface and ground waters in and around the Canada Brick Quarry property. Mary Fix Creek, which traverses the Canada Brick Quarry ash disposal site was sampled on October 8, 1987, April 25 and August 31, 1988. Surface water quality of Mary Fix Creek is undergoing changes with respect to the major ions. Calcium, bicarbonate alkalinity, sodium and chloride concentrations have increased at all four locations compared to pre-operational (1980-1981) levels. However, the increase in the indicators of fly ash leachate (boron and strontium) measured within the Canada Brick Quarry site (SPF) during October 1987, exceeded the levels measured at the CPO significantly. The measured increases in the indicators of fly ash leachate suggest that Mary Fix Creek water has been mixed or contaminated with leachate. The high levels of suspended solids measured at the CPO last year, decreased in 1987/88 and trace metal concentrations still conform to Provincial Surface Water Quality Objectives.

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MRB

job	file	date	report no.
31-238-892	837.71	December 14, 1988	88-266-K

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To

To: Mr. D. Erwin
Manager of Procurement - General Products
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CANADA BRICK QUARRY SURFACE WATER SURVEY
SEVENTH ANNUAL REPORT 1988

1. INTRODUCTION

Surface water monitoring of Mary Fix Creek has been underway at the Canada Brick Quarry Reclamation Project since December 1981. The monitoring program began following the issuance of a Provisional Certificate of Approval No A220113 by the Ontario Ministry of the Environment (MOE). For the 1987-1988 sampling year, Ontario Hydro proposed to the City of Mississauga and the MOE that a reduced surface water monitoring program be implemented. The reduced surface water monitoring program entailed monitoring Mary Fix Creek in the spring (during high flow) and fall (during low flow), and to reduce the sampling locations monitored to the CP overpass (CPO) and South Property Fence (SPF).

The Canada Brick Quarry Reclamation project has been filled to near final grade based on minimum fill scenario/1/. The proposed reduced surface water monitoring program was implemented by Ontario Hydro in April 1988, prior to receiving a copy of a letter written by Mr. W.P. Taylor, Commissioner of Public Works, City of Mississauga, to Mr. G.B. Nelson, District Officer, Industrial Abatement Section, MOE, Re: "Canada Brick Company Quarry Reclamation Project (formerly Domtar Construction Materials Limited) Progress Report No 6 - December 1987," dated June 22, 1988, rejecting the reduced surface water monitoring program. Consequently, for April 1988, surface water samples were not collected at Dundas Street Culvert (DSC) and Paisley Street Bridge (PSB).

Due to residential developments occurring north of the CPO, Mary Fix Creek has been channelized to approximately 5m width. The old culvert at the CPO has been replaced by three culverts, each approximately 2.5m in diameter, to handle the high volume of storm water expected from the developed areas. According to City of Mississauga officials and G.M. Sernas Consultants, the design flow was based on an estimated regional flow rate of $40m^3/sec$/2/.

This report covers the analyses of surface water samples from October 1987, to September 1988. The analytical data reported includes previous surface water surveys/3,4,5,6,7,8/ as well as surveys carried out in the 1987-1988 sampling year. Surface water sampling locations are shown in Figure 1.

2. FLOW MEASUREMENTS

Flow measurements of Mary Fix Creek used to be carried out using a "portable" chain gauge in the culvert located at the CP railway overpass (CPO). For the 1987-1988 sampling year, static water level measurements were not taken because the area (CPO) was inaccessible. Future flow measurements of Mary Fix Creek have also been complicated by the channelization of the Creek. Considering the width of the channel, future flow measurements may have to be taken using a parshall flume or other similar type of device.

3. SURFACE WATER SURVEY 1987-1988

Sampling of Mary Fix Creek was carried out on October 8, 1987, April 4 and August 31, 1988. Surface water samples were collected at each of the four locations listed below during the 1987-1988 sampling period.

1) C.P. Overpass (CPO)
2) South Property Fence (SPF)
3) Dundas Street Culvert (DSC)
4) Paisley Street Bridge (PSB)

For the April 4, 1988, sampling the CPO and SPF were the only locations sampled due to the implementation of a reduced surface water sampling program. For the surface water samples, total and dissolved (soluble) trace metals analyses were conducted for each location. The procedure used for sample collection and preservation is described in Appendix A. For the dissolved metals analyses one sample from each location was filtered through a 0.45 μm Millipore filter prior to submission for chemical analyses. The other unfiltered sample was submitted for total trace metals (except mercury) determination/9,10/.

Analytical data for the 1987-1988 sampling period are summarized in Tables B1 to B4 of Appendix B. Included in the summary are previous surface water data to enable comparison. Major ion chemistry and Piper trilinear diagrams for each location are summarized in Tables C1 to C4 and Figures 2 to 5 of Appendix C. Time trend analyses for selected parameters are shown in Appendix D.

3.1 Surface Water Characteristics

Surface water characteristics at the CPO appear to be undergoing changes with respect to some major constituents. For the 1988 sampling year, elevated levels of calcium and bicarbonate alkalinity were measured at the CPO. Bicarbonate alkalinity concentration measured at the CPO in September 1988, was 292 mg/L (as $CaCo_3$) compared to 36 mg/L (as $CaCo_3$) measured in March 1982

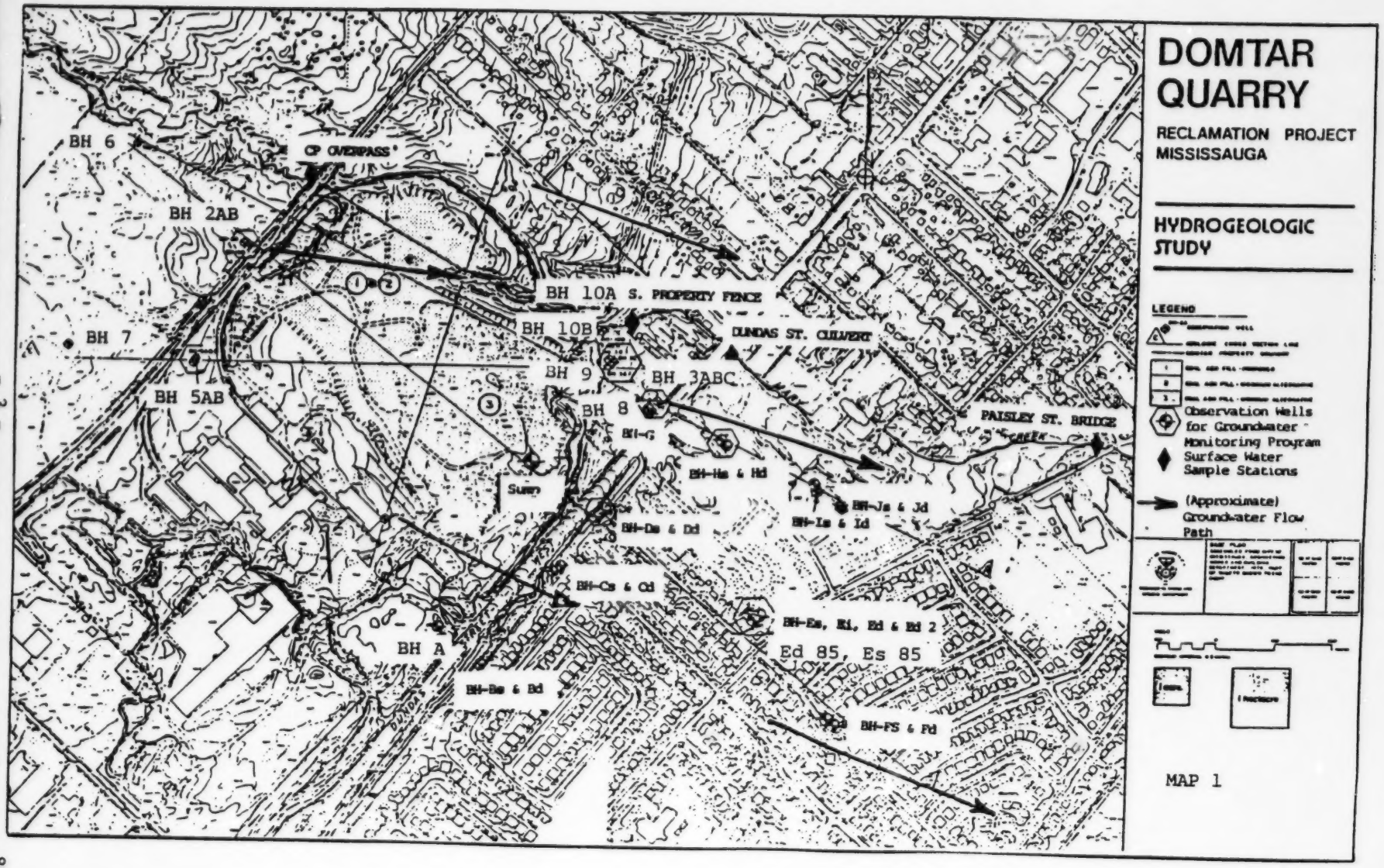
DOMTAR QUARRY
RECLAMATION PROJECT
MISSISSAUGA
HYDROGEOLOGIC STUDY
LEGEND
Observation Wells for Groundwater Monitoring Program
Surface Water Sample Stations
(Approximate) Groundwater Flow Path
MAP 1
BH 6
BH 2AB
BH 7
BH 5AB
BH A
BH 10A
BH 10B
BH 9
BH 8
BH 3ABC
BH-G
CP OVERPASS
S. PROPERTY FENCE
DUNDAS ST. CULVERT
PAISLEY ST. BRIDGE
Sump
BH-Ha & Hd
BH-Da & Dd
BH-Ca & Cd
BH-Ja & Jd
BH-Ia & Id
BH-Ea, Ei, Ed & Ed 2
Ed 85, Es 85
BH-Ba & Bd
BH-Fa & Fd

FIGURE 1

(Figure D1). In addition, calcium, strontium, sodium and chloride concentrations showed steady increases in 1988 at the CPO (Figures D4, D5, D6 and D7).

The increased parameter levels measured at the CPO may now be a permanent characteristic of the surface water quality. The waters at the CPO which were dominant in alkali metal cations (sodium) and strong acid anions (chloride) in October 1987 and April 1988, have changed to "no dominance" in any of the cations and dominance in strong acid anions (chlorides) by September 1988 (Table C1 and Figure 2).

The water quality within the Canada Brick Quarry site, ie, by the SPF indicated significant increases in calcium, sulphate, boron, strontium, sodium and chloride during October 1987. (Figures D3 to D8). Boron and strontium (indicators of fly ash leachate) levels measured at the SPF exceeded the levels measured at the CPO significantly. Boron concentrations at the CPO in October 1987, were 1.19 mg/L compared to 4.07 mg/L at the SPF during the same period. The boron levels dropped to 3.68 mg/L at the DSC and 1.28 mg/L by PSB in October 1987. The increased concentrations boron and strontium in Mary Fix Creek during October 1987, suggest that the water from the Creek has been contaminated with leachate. In general, most of the major elements increased at each location in October 1987, but decreased to almost background (CPO) levels by September 1988. The increases observed in parameter levels during October 1987, cannot be attributed to a hot/dry weather since the precipitation rate during that period exceeded the 30 year monthly average/11/. The high levels of suspended solids (TSS) measured at the CPO last year have decreased considerably in 1988. The decrease in TSS may be due to the use of gabions (on the bottom and side slopes) north of the CPO in the channelized Mary Fix Creek. The gabions have probably slowed down the flow of water in the Creek and enabled settling of suspended solids.

Major ion chemistry for the waters of Mary Fix Creek indicate that alkali metal cations (sodium) and strong acid anions (chloride) dominate at the SPF, DSC and PSB.

4. SUMMARY AND CONCLUSIONS

Mary Fix Creek was sampled in October 1987, April and August 1988. The waters at most sampling locations were characterized as dominant in alkali metal cation (sodium) and strong acid anions (chlorides). The increases in some major constituents, such as bicarbonate alkalinity, calcium and chloride at the CPO may now be a permanent characteristic of the waters at this location. Elevated levels of boron, strontium, sodium, chloride and sulphate were measured at the SPF during the October 1987, sampling period. It appears from the results of the chemical analyses that the water from the Creek has been contaminated with leachate at the time.

5. ACKNOWLEDGEMENTS

The author wishes to thank Mr. D.H. Barber and Mr. A.Z. Mlynarczyk for their help in the preparation of this report.

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REFERENCES

1. Proposed Reclamation Project, for The Domtar Quarry, Mississauga, Environment Report, June 1980.

2. Personal communication with Mr. Brian Chang, City of Mississauga, and Mr. Victor Gupta, G.M. Sernas Consultants, (Tel: 259-6323).

3. Ontario Hydro Research Division Report No 82-480-K.

4. Ontario Hydro Research Division Report No 83-523-K.

5. Ontario Hydro Research Division Report No 84-453-K.

6. Ontario Hydro Research Division Report No 85-326-K.

7. Ontario Hydro Research Division Report No 82-332-K.

8. Ontario Hydro Research Division Report No 87-283-K.

9. "Water Management. Goals, Policies, Objectives and Implementation Procedures of the Ministry of the Environment." Published November, 1978.

10. "Standard Methods for the Examination of Water and Wastewater," 15th Edition, Part 302, American Public Health Association, New York, N.Y., 1980.

11. Personal communication with Environment Canada, Climatology Department, October 7, 1988, Tel. 973-8775.

APPENDIX A

CANADA BRICK QUARRY SURFACE WATER SURVEY
(MARY FIX CREEK)

METHOD OF
SAMPLE COLLECTION AND
PREPARATION FOR ANALYSIS

Pairs of samples from each location were collected in specially acid-pretreated linear polyethylene (LPE) 1-L bottles, stored in a cooler (~4°C) and returned the same day to the laboratory. Details of sample handling and preservation, prior to submission for detailed chemical analysis, are described below.

(a) Filtered Samples

One sample of each pair was filtered in the laboratory through a 0.45 μm Millipore filter to remove suspended solids. The glass Millipore vacuum filtration apparatus was cleaned by soaking in 1:1 hydrochloric acid (HCl) followed by a deionized water rinse and a further soaking in 1:1 nitric acid (HNO_3). This was followed by several thorough rinsings with deionized water. Millipore filters were rinsed by passing 500 mL of deionized water through the filter and discarding the filtrate. A small volume (~20 mL) of the sample was passed through the filter and also discarded, then bulk of the sample was filtered. The empty original sample contianer was rinsed several times with deionized water, given a final rinse using a small volume (~10 mL) of sample filtrate, and reused for storing the unacidified portion.

The portion of the filtrate for trace metal analysis was acidified with ultrapure HNO_3 to a background concentration of 0.1 M. The unacidified portion for pH, alkalinity, conductivity and anion analysis was stored at ~4°.

(b) Unfiltered Samples

To determine total concentrations of dissolved components (in particular, trace metals), samples were submitted for chemical analysis **without** filtration in accordance with MOE Objectives/6/. A portion of each sample was acidified with ultrapure HNO_3 to a background of 0.1 M, and an unacidified portion stored at ~4°C pending pH, alkalinity, conductivity and anion analysis.

APPENDIX B

CANADA BRICK QUARRY SURFACE WATER SURVEY
(MARY FIX CREEK)

CHEMICAL ANALYSIS
1980-1988

Sampling Locations

CPO - CP Overpass
SPF - South Property Fence
DSC - Dundas Street Culvert
PSB - Paisley Street Bridge

All values are in mg/L except pH and conductivity

- pH in pH units
- conductivity in mS/m
- Alkalinity in mg/L As $CaCO_3$

Ashwater Test Codes Used for Canada Brick Quarry Surface Water
and Analytic Methods Used This Reporting Period

AG	Silver by graphite furnace atomic absorption spectroscopy
AL	Aluminium by atomic absorption spectroscopy or inductively coupled plasma
ALKCO3	Carbonate alkalinty by titration (mg $CaCO_3$/L)
ALKHCO3	Bicarbonate alkalinty by titration (mg $CaCO_3$/L)
ALKOH	Hydroxide alkalinty by titration (mg $CaCO_3$/L)
AS	Arsenic by cold vapour atomic absorption spectroscopy
B	Born by continuous flow colorimetry or inductively coupled plasma
BA	Barium by atomic absorption spectroscopy or inductively coupled plasma or neutron activation analysis
BE	Beryllium by graphite furnace atomic absorption spectroscopy
BR	Bromine by neutron activation analysis
CA	Calcium by atomic absorption spectroscopy or inductively coupled plasma
CD	Cadmium by graphite furnace atomic absorption spectroscopy
CL	Chloride by ion chromatography
CO	Cobalt not analysed this reporting period
COND	Electrical conductivity by electrometry (mS/m)
CR	Chromium by atomic absorption spectroscopy or inductively coupled plasma
CR(VI)	Hexavalent chromium by colorimetry
CU	Copper by graphite furnace atomic absorption spectroscopy
FE	Iron by atomic absorption spectroscopy or inductively coupled plasma
HARD	Magnesium and calcium hardness calculated from those values (mg $CaCO_3$/L)
HG	Mercury by cold vapour atomic absorption spectroscopy
I	Iodine by neutron activation analysis
K	Potassium by atomic absorption spectroscopy or inductively coupled plasma
MG	Magnesium by atomic absorption spectroscopy or inductively coupled plasma
MN	Manganese by atomic absorption spectroscopy or inductively coupled plasma
MO	Molybdenum by atomic absorption spectroscopy or inductively coupled plasma
NA	Sodium by atomic absorption spectroscopy or inductively coupled plasma
NI	Nickel by graphite furnace atomic absorption spectroscopy
NO3	Nitrate by continuous flow colorimetry
PB	Lead by graphite furnace atomic absorption spectroscopy
PH	pH by electrometry (pH units)
SE	Selenium by cold vapour atomic absorption spectroscopy
SiO2	Total silica by colorimetry, or silicon by inductively coupled plasma, expressed as silicon dioxide (mg SiO_2/L)
SO4	Sulphate by ion chromatography
SR	Strontium by atomic absorption spectroscopy or inductively coupled plasma
TDS105	Total dissolved solids at 105 C by gravimetry
TI	Titanium by atomic absorption spectroscopy or inductively coupled plasma or neutron activation analysis
TOC	Total organic carbon by oxidation and infrared spectroscopy
TSS105	Total suspended solids at 105 C by gravimetry
U	Uranium by neutron activation analysis
V	Vanadium by atomic absorption spectroscopy or neutron activation analysis
ZN	Zinc by atomic absorption spectroscopy or inductively coupled plasma

Table B1

Chemical Characteristics of Canada Brick Quarry Surface Water

Location CPO

Date	800507	811130	820314	820324	820813	820827	820924	830921	830922*
AG	--	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
AL	--	<0.200	--	<0.200	<0.600	<0.200	<0.500	<0.500	<0.500
ALKCO3	2.00	--	<5.00	<5.00	24.0	<5.00	10.0	26.0	24.0
ALKHCO3	201	110	36.0	86.0	240	64.0	137	163	165
ALKOH	<5.00	--	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
AS	--	0.0010	--	<0.0010	0.0010	<0.0020	<0.0020	<0.0010	<0.0010
B	--	<0.500	--	<1.00	<0.500	<0.500	<1.00	0.160	0.190
BA	--	<1.00	--	<2.00	<8.00	1.00	1.30	<2.00	<0.500
BE	--	--	--	--	<0.0002	<0.0002	<0.0002	--	--
BR	--	0.100	--	<0.200	0.600	<0.200	1.40	0.210	0.590
CA	81.0	57.0	15.0	34.0	116	43.0	72.0	89.0	88.0
CD	--	0.0009	--	0.0003	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
CL	136	40.0	26.0	60.0	177	22.0	85.0	120	130
CO	--	--	--	--	--	--	<0.0500	--	--
COND	94.0	47.0	19.0	39.0	124	35.0	66.0	94.0	94.0
CR	--	<0.100	--	<0.0500	<0.0500	0.0030	<0.0500	<0.100	<0.100
CR(VI)	--	0.0090	--	0.0080	0.0040	--	--	<0.0100	<0.0100
CU	--	0.0030	--	0.0050	0.0040	0.0080	0.0030	0.0040	0.0050
FE	--	<0.0500	--	0.0500	<0.0500	<0.0500	<0.0100	<0.0500	0.460
HARD	303	208	49.0	120	429	142	250	313	315
HG	--	--	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
I	--	<0.0100	--	<0.0200	<0.200	<0.0500	<0.0500	<0.0050	<0.0050
K	6.00	4.90	3.90	4.30	4.00	3.40	4.90	0.660	0.670
MG	24.4	16.0	2.70	8.30	34.0	8.40	18.0	22.0	23.0
MN	--	<0.0200	--	0.200	0.240	<0.0200	<0.0200	0.0500	0.0600
MO	--	<0.500	--	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
NA	60.0	20.0	16.0	27.0	97.0	12.0	34.0	71.0	71.0
NI	--	<0.0050	--	<.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
NO3	<0.100	<0.100	--	0.100	<0.200	17.0	4.50	<1.00	0.440
PB	--	0.0020	--	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
PH	8.30	8.10	7.00	7.80	8.20	7.90	8.00	8.30	8.20
SE	--	0.0010	--	<0.0010	<0.0020	<0.0020	<0.0020	<0.0010	<0.0010
SIO2	--	5.00	--	3.30	4.80	3.60	7.40	7.47	7.10
SO4	81.0	70.0	14.0	26.0	140	49.0	95.0	95.0	94.0
SR	--	0.130	--	0.140	0.800	0.130	0.280	0.500	0.500
TDS105	--	370	--	260	756	208	380	628	614
TI	--	<0.500	--	<1.00	<2.00	<1.00	<1.00	<1.00	<1.00
TOC	--	--	--	15.0	22.0	12.0	17.0	6.00	4.00
TSS105	--	22.0	--	--	--	--	31.0	7.00	7.00
U	--	<0.0100	--	<0.0100	<0.0600	<0.0200	<0.0010	<0.0100	<0.0100
V	--	<0.0050	--	<0.0100	<0.0200	<0.0030	<0.500	<0.0050	<0.0050
ZN	--	<0.0200	--	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200

* Unfiltered sample dated one day after actual sampling.

Table B1 (Cont)

Chemical Characteristics of Canada Brick Quarry Surface Water

Location CPO

Date	831017	831018*	840217	840218*	840930	841001*	850702	850703*
AG	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
AL	<0.500	6.00	<0.500	6.80	<0.500	1.60	<1.00	<1.00
ALKCO3	<5.00	<5.00	<5.00	<5.00	7.00	<5.00	<5.00	<5.00
ALKHCO3	64.0	68.0	37.0	45.0	95.0	103	218	219
ALKOH	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
AS	0.0010	<0.0010	<0.0010	0.0010	<0.0010	<0.0010	<0.0010	<0.0010
B	0.110	0.110	0.0800	0.0500	<0.0500	<0.0500	0.150	0.180
BA	<1.00	<1.00	<1.00	<1.00	<2.00	<2.00	<5.00	<5.00
BE	--	--	--	--	--	--	--	--
BR	<0.0500	<0.0500	<0.100	<0.100	<0.200	0.200	0.900	<0.500
CA	29.0	31.0	21.4	26.9	34.7	46.1	130	129
CD	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0003	<0.0003
CL	24.0	24.0	61.5	66.1	99.0	98.0	639	572
CO	--	--	--	--	--	--	--	--
COND	28.3	28.6	34.0	34.0	62.0	61.0	241	240
CR	<0.100	<0.100	<0.0500	<0.0500	<0.100	<0.100	<0.100	<0.100
CR(VI)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0050	<0.0050
CU	0.0030	0.0100	0.0090	0.0120	0.0020	0.0080	0.0070	0.0090
FE	0.130	5.60	0.100	9.60	<0.100	0.880	<0.0500	0.180
HARD	96.0	119	71.0	116	137	166	494	491
HG	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0006	<0.0002	<0.0002
I	<0.0050	<0.0050	<0.0500	<0.0500	0.0600	<0.0600	<0.100	<0.100
K	4.90	6.30	3.10	7.30	4.87	5.49	6.75	6.48
MG	5.70	7.80	4.30	7.70	12.2	12.5	40.7	41.2
MN	<0.0500	0.260	0.0800	0.340	<0.0500	<0.0500	0.0980	0.0980
MO	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	0.500
NA	16.0	16.0	35.0	33.0	34.6	47.8	310	313
NI	<0.0050	0.0060	<0.0050	0.0100	<0.0050	<0.0050	<0.0100	<0.0100
NO3	0.0200	1.43	4.09	4.20	0.130	0.0900	--	<0.0090
PB	0.0020	0.0160	<0.0020	0.0080	<0.0020	<0.0020	<0.0050	<0.0050
PH	7.90	7.70	7.40	7.50	7.90	7.60	8.30	8.30
SE	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
SIO2	3.89	3.70	2.94	12.0	2.70	8.50	1.41	2.06
SO4	30.0	29.0	17.3	18.3	44.0	43.0	151	140
SR	0.120	0.150	0.100	0.130	0.340	0.340	1.22	1.22
TDS105	190	190	222	230	392	378	1460	1350
TI	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
TOC	8.00	10.0	12.4	12.3	25.0	25.0	30.0	27.5
TSS105	--	15.0	--	387	--	--	--	3.10
U	<0.0500	<0.0500	<0.0100	<0.0100	<0.0500	<0.0500	<0.100	<0.100
V	<0.0050	<0.0050	<0.0050	0.0300	<0.0100	<0.0100	<0.100	<0.0500
ZN	<0.0200	0.0400	<0.0200	0.0300	<0.0200	<0.0200	<0.0200	<0.0200

* Unfiltered sample dated one day after actual sampling.

Table B1 (Cont)

Chemical Characteristics of Canada Brick Quarry Surface Water

Location CPO

Date	851005	851006*	860618	860619*	861008	861009*	870403	870404*
AG	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002
AL	<1.00	3.30	<1.00	22.7	<1.00	32.0	<1.00	2.00
ALKCO3	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
ALKHCO3	107	90.0	188	188	162.	160.	137.	138.
ALKOH	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
AS	<0.0010	<0.0010	0.0010	0.0050	<0.0010	0.0020	0.0012	0.0021
B	0.100	0.160	0.130	0.170	0.210	0.220	0.150	0.200
BA	<0.500	<0.500	<0.500	<0.500	<8.00	<60.0	<15.0	<15.0
BE	--	--	--	--	--	--	--	--
BR	<0.100	<0.100	0.300	<0.500	0.700	2.00	<5.00	<10.0
CA	39.1	40.9	74.0	88.0	69.0	138.	69.0	72.0
CD	<0.0001	<0.0001	<0.0002	<0.0002	<0.0002	0.0002	<0.0001	<0.0001
CL	43.6	42.2	193	192	118.	120.	220.	240.
CO	--	--	--	--	--	--	--	--
COND	40.5	40.0	114	114	78.0	77.5	114.	116.
CR	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
CR(VI)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0050	<0.0050
CU	0.0040	0.0030	0.0060	0.0450	0.0120	0.130	0.0040	0.0100
FE	0.100	1.95	<0.0500	38.0	<0.0500	40.0	<0.100	3.20
HARD	134	143	273	421	252.	500.	254.	270.
HG	<0.0002	0.0003	<0.0002	<0.0002	<0.0002	0.0007	0.0002	<0.0002
I	<0.0500	<0.0600	<0.100	<0.300	<0.200	<2.00	<0.500	<0.500
K	4.61	4.95	5.00	7.50	6.70	10.0	5.00	5.10
MG	8.93	9.96	21.7	32.5	19.5	38.0	20.0	21.0
MN	<0.0500	0.0500	0.0500	0.700	<0.0500	1.06	0.0600	0.130
MO	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
NA	28.9	29.3	105	104	67.0	69.0	119.	122.
NI	<0.0050	<0.0050	<0.0050	0.0440	<0.0050	0.158	<0.0050	0.0050
NO3	0.337	1.86	1.23	1.70	1.80	1.75	3.80	3.91
PB	<0.0020	<0.0020	<0.0050	<0.0050	<0.0050	0.0080	<0.0020	<0.0020
PH	7.80	7.30	8.10	7.90	8.30	8.40	8.27	8.06
SE	0.0010	0.0030	0.0010	0.0030	0.0070	0.0200	0.0010	0.0020
SIO2	0.620	3.13	6.25	--	6.70	75.0	5.05	13.5
SO4	38.5	37.7	67.0	70.0	78.0	112.	99.0	99.0
SR	0.400	0.320	0.700	0.780	0.770	1.00	0.730	0.710
TDS105	252	239	550	650	472.	466.	763.	731.
TI	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
TOC	12.0	9.00	30.0	45.0	8.00	6.00	8.20	8.30
TSS105	--	14.0	--	--	--	3800	--	--
U	<0.0500	<0.0200	0.0200	<0.100	<0.0600	<2.00	<0.200	<0.200
V	<1.00	<1.00	<0.0100	0.180	<0.0100	1.50	<0.0500	<0.0500
ZN	<0.0200	0.0200	<0.0200	0.100	<0.0200	0.140	<0.0200	<0.0200

* Unfiltered sample dated one day after actual sampling.

Table B1 (Cont)

Chemical Characteristics of Canada Brick Quarry Surface Water

Location CPO

Date	870625	870626*	871008	871009*	880425	880831	880901*
AG	<0.0005	<0.0005	<0.0005	<0.0005	--	<0.0001	<0.0001
AL	<1.00	<1.00	<1.00	5.00	--	<0.0600	<0.0600
ALKCO3	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
ALKHCO3	200.	197.	220.	230.	276.	291.	292.
ALKOH	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
AS	<0.0010	<0.0010	<0.0010	<0.0010	--	<0.0010	<0.0010
B	0.350	0.350	1.17	1.19	0.800	0.700	0.800
BA	<2.00	<2.00	<5.00	<3.00	--	<3.00	<3.00
BE	--	--	--	--	--	--	--
BR	<0.500	0.500	3.50	4.00	--	2.40	2.30
CA	100.	100.	105.	107.	162.	173.	150.
CD	<0.0001	<0.0001	<0.0002	<0.0002	--	<0.0001	<0.0001
CL	233.	231.	432.	432.	600.	430.	430.
CO	--	--	--	--	--	--	--
COND	146.	145.	205.	210.	--	210.	215.
CR	<0.100	<0.100	<0.100	<0.100	--	<0.0200	<0.0200
CR(VI)	--	<0.0050	<0.0050	<0.0050	--	<0.0100	<0.0100
CU	0.0040	0.0060	0.0030	0.0100	--	<0.0050	<0.0050
FE	<0.0500	0.910	<0.0500	8.00	--	<0.0200	<0.0200
HARD	394.	398.	459.	477.	--	628.	571.
HG	0.0007	<0.0002	<0.0002	<0.0002	--	<0.0001	<0.0001
I	<0.0500	<0.0500	<0.200	<0.100	--	<0.500	<0.500
K	14.0	14.0	17.0	17.0	16.0	15.0	17.0
MG	35.0	36.0	48.0	52.0	60.0	48.0	48.0
MN	<0.0500	0.0600	0.100	0.260	--	0.0400	0.0400
MO	<0.500	<0.500	<0.500	<0.500	--	<0.0300	<0.0300
NA	141.	140.	234.	238.	311.	203.	208.
NI	<0.0050	<0.0050	<0.0050	0.0050	--	<0.0100	<0.0100
NO3	6.50	6.60	5.96	7.79	--	10.3	10.3
PB	<0.0050	<0.0050	<0.0050	<0.0050	--	<0.0020	<0.0020
PH	8.30	8.20	8.38	8.21	7.60	8.10	8.20
SE	<0.0010	<0.0010	0.0030	0.0030	--	<0.0010	<0.0010
SIO2	6.80	6.35	4.12	54.5	--	8.20	9.10
SO4	149.	141.	203.	194.	247.	230.	220.
SR	1.65	1.66	3.00	3.00	3.50	2.80	3.39
TDS105	928.	904.	1310	1320	1590	1380	1360
TI	<1.00	<1.00	<1.00	<1.00	--	<0.0500	<0.0500
TOC	7.70	7.70	<0.500	<0.500	--	2.00	1.80
TSS105	--	--	--	285.	0.800	--	6.00
U	<0.0200	<0.0200	<0.0500	<0.0300	--	<0.0600	<0.0600
V	<0.0100	<0.0100	<0.0200	<0.0100	--	<0.0400	<0.0400
ZN	<0.0200	<0.200	0.0200	0.0400	--	0.0800	0.0800

* Unfiltered sample dated one day after actual sampling.

Table B2

Chemical Characteristics of Canada Brick Quarry Surface Water

Location SPF

Date	800507	811130	820314	820324	820813	820827	820924	830921	830922*
AG	--	0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
AL	--	<0.200	--	<0.200	<3.00	<0.200	<0.500	<0.500	<0.500
ALKCO3	5.60	--	<5.00	<5.00	14.0	<5.00	13.0	14.0	25.0
ALKHCO3	190	110	40.0	83.0	99.0	63.0	120	117	107
ALKOH	<5.00	--	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
AS	--	0.0010	--	<0.0010	<0.0010	<0.0020	<0.0020	0.0010	0.0010
B	--	<0.500	--	<1.00	2.50	<0.500	<1.00	2.10	2.11
BA	--	<1.00	--	<2.00	<40.0	1.00	1.40	<2.00	<2.00
BE	--	--	--	--	<0.0002	<0.0002	<0.0002	--	--
BR	--	0.100	--	<0.200	16.0	0.300	1.50	12.0	12.0
CA	79.0	57.0	17.0	33.0	259	45.0	72.0	207	208
CD	--	0.0002	--	<0.0010	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
CL	122	42.0	34.0	55.0	1700	41.0	215	1200	1130
CO	--	--	--	--	--	--	<0.0500	--	--
COND	90.0	50.0	23.3	36.5	600	43.0	107	445	445
CR	--	<0.100	--	<0.0500	<0.0500	0.0040	<0.0500	<0.100	<0.100
CR(VI)	--	0.0050	--	<0.0050	0.0040	--	--	<0.0100	<0.0100
CU	--	0.0030	--	0.0050	0.0070	0.0070	0.0030	0.0030	0.0040
FE	--	0.0500	--	0.0500	<0.0500	<0.0500	<0.100	<0.0500	0.410
HARD	291	215	56.0	116	869	148	250	707	712
HG	--	--	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
I	--	<0.0100	--	<0.0200	<1.00	<0.0500	<0.0500	<0.0200	<0.0200
K	5.00	5.40	4.00	4.60	42.0	4.10	9.80	35.0	35.0
MG	22.8	16.0	3.30	8.10	54.0	8.60	18.0	46.0	47.0
MN	--	<0.0200	--	0.200	0.0400	<0.0200	<0.0200	0.0500	0.0600
MO	--	0.500	--	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
NA	61.0	26.0	19.0	28.0	900	2.90	105	630	640
NI	--	<0.0050	--	<0.0050	0.0120	<0.0050	<0.0050	<0.0050	<0.0050
NO3	<0.100	<0.100	--	0.100	15.0	21.0	8.00	13.0	10.1
PB	--	<0.0020	--	0.0200	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
PH	8.50	8.20	7.40	7.90	8.20	7.90	8.10	8.20	8.10
SE	--	<0.0010	--	<0.0010	<0.0020	<0.0020	<0.0020	0.0030	0.0030
SIO2	--	6.50	--	3.80	2.60	4.00	6.80	4.67	3.98
SO4	78.0	72.0	14.0	23.0	450	63.0	145	330	330
SR	--	0.130	--	0.140	4.80	0.200	0.640	2.85	2.85
TDS105	--	370	--	252	3770	260	620	2810	2680
TI	--	<0.500	--	<1.00	<10.0	<1.00	<1.00	<1.00	<1.00
TOC	--	--	--	15.0	9.00	10.0	17.0	12.0	14.0
TSS105	--	41.0	--	--	--	--	85.0	15.0	15.0
U	--	<0.0100	--	<0.0100	<0.300	<0.0200	<0.0010	<0.0500	<0.0500
V	--	<0.0050	--	<0.0100	<0.100	<0.0030	<0.500	<0.0200	<0.0200
ZN	--	<0.0200	--	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200

* Unfiltered sample dated one day after actual sampling.

Table B2 (Cont)

Chemical Characteristics of Canada Brick Quarry Surface Water

Location SPF

Date	831017	831018*	840217	840218*	840930	841001*	850702	850703*
AG	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
AL	<0.500	23.0	<0.500	9.00	<0.500	1.90	<1.00	<1.00
ALKCO3	<5.00	<5.00	<5.00	<5.00	9.00	<5.00	<5.00	<5.00
ALKHCO3	67.0	94.0	39.0	50.0	94.0	103	137	138
ALKOH	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
AS	0.0050	<0.0010	<0.0010	0.0020	<0.0010	<0.0010	<0.0010	<0.0010
B	0.200	0.200	0.0700	0.0700	0.150	0.200	3.04	3.05
BA	<1.00	<1.00	<1.00	<1.00	<2.00	3.00	<5.00	5.00
BE	--	--	--	--	--	--	--	-
BR	0.150	0.250	<0.100	0.200	0.500	0.500	12.0	12.0
CA	29.0	40.0	22.0	35.0	35.7	49.9	261	264
CD	0.0001	0.0003	<0.0001	<0.0001	<0.0001	<0.0001	<0.0003	<0.0003
CL	35.0	35.0	65.4	66.6	125	118	1420	1310
CO	--	--	--	--	--	--	--	--
COND	34.0	34.1	36.0	37.0	70.0	70.0	505	505
CR	<0.100	<0.100	<0.0500	<0.0500	<0.100	<0.100	<0.100	<0.100
CR(VI)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0050	<0.0050
CU	0.0030	0.0300	0.0030	0.0170	0.0080	0.0070	0.0060	0.0040
FE	0.130	38.0	0.0900	16.0	<0.100	1.48	<0.0500	0.351
HARD	97.0	250	73.0	159	120	164	881	900
HG	<0.0002	<0.0002	<0.0002	<0.0002	0.0006	0.0007	0.0003	0.0002
I	<0.0050	<0.0050	<0.0500	<0.0500	<0.0600	<0.0600	<0.100	<0.200
K	6.20	9.20	3.40	8.30	3.98	5.45	40.4	42.5
MG	6.10	20.0	4.50	10.5	7.50	9.60	55.9	58.6
MN	<0.0500	0.750	0.0800	0.460	<0.0500	<0.0500	0.0500	0.0500
MO	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	1.27	1.27
NA	27.0	27.0	43.0	36.0	49.4	70.8	720	725
NI	<0.0050	0.0240	<0.0050	0.0100	<0.0050	<0.0050	<0.0100	<0.0100
NO3	1.36	2.21	3.94	4.91	0.180	0.130	--	83.7
PB	0.0020	0.0210	<0.0020	0.0100	<0.0020	<0.0020	<0.0050	<0.0050
PH	7.50	7.80	7.30	7.60	7.90	7.70	8.20	8.20
SE	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0040	0.0020
SIO2	3.66	3.64	3.11	103	2.70	9.80	3.45	10.2
SO4	38.0	36.0	18.5	19.6	50.0	45.6	768	718
SR	0.190	0.280	0.120	0.160	0.490	0.520	5.95	5.95
TDS105	220	240	230	244	423	430	3440	3250
TI	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
TOC	13.0	12.0	11.8	13.5	19.0	21.0	25.0	26.5
TSS105	--	31.0	--	590	--	--	--	35.2
U	<0.0500	<0.0500	<0.0100	<0.0100	<0.0500	<0.0500	<0.100	<0.100
V	<0.0050	0.0170	<0.0050	0.0800	<0.0100	<0.0100	<0.100	<0.0500
ZN	<0.0200	0.120	<0.0200	0.0400	<0.0200	<0.0200	<0.0200	<0.0200

* Unfiltered sample dated one day after actual sampling.

Table B2 (Cont)

Chemical Characteristics of Canada Brick Quarry Surface Water

Location SPF

Date	851005	851006*	860618	860619*	861008	861009*	870403	870404*
AG	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002
AL	<1.00	3.30	<1.00	5.00	<1.00	6.00	<1.00	3.30
ALKCO3	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
ALKHCO3	88.0	90.0	187	189	131.	131.	135.	138.
ALKOH	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
AS	0.0020	0.0030	<0.0010	<0.0010	<0.0010	0.0030	0.0012	0.0017
B	0.230	0.270	0.270	0.310	1.14	1.15	0.210	0.240
BA	<0.500	<0.500	<0.500	<0.500	<8.00	<8.00	<15.0	<15.0
BE	--	--	--	--	--	--	--	--
BR	<0.100	0.200	0.400	0.500	1.70	1.20	<5.00	<10.0
CA	41.4	42.5	72.7	75.0	86.0	86.0	68.0	71.0
CD	<0.0001	<0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	0.0001
CL	51.1	51.5	215	210	162.	164.	222.	244.
CO	--	--	--	--	--	--	--	--
COND	46.5	47.5	120	122	110.	113.	115.	118.
CR	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
CR(VI)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0050	<0.0050
CU	0.0030	0.0030	0.0070	0.0150	0.0050	0.0300	0.0040	0.0100
FE	0.0500	2.29	<0.0500	4.20	<0.0500	9.50	<0.100	6.00
HARD	141	148	268	289	290.	300.	252.	267.
HG	<0.0002	0.0005	<0.0002	<0.0002	<0.0002	0.0003	<0.0002	<0.0002
I	<0.0500	<0.0500	<0.100	<0.300	<0.200	<0.200	<0.500	<0.500
K	5.95	6.21	5.87	7.80	16.0	17.0	5.80	6.10
MG	9.19	10.2	21.2	23.2	18.5	21.0	20.0	22.0
MN	<0.0500	0.0500	<0.0500	0.0900	<0.0500	0.160	0.0500	0.180
MO	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
NA	40.8	38.3	130	130	113.	114.	128.	129.
NI	<0.0050	<0.0050	<0.0050	0.0050	<0.0050	0.0240	<0.0050	0.0050
NO3	0.0350	3.89	3.08	2.77	3.61	3.84	4.60	4.90
PB	<0.0020	<0.0020	<0.0050	<0.0050	<0.0050	<0.0050	<0.0020	<0.0020
PH	7.50	7.30	8.30	8.30	8.30	8.20	8.29	8.11
SE	0.0040	0.0030	0.0010	<0.0010	0.0080	0.0050	0.0017	0.0021
SIO2	0.210	25.3	5.15	5.05	4.00	4.60	4.40	21.0
SO4	58.4	55.5	85.0	88.0	229.	228.	102.	104.
SR	0.310	0.350	0.770	0.780	1.47	1.52	0.730	0.730
TDS105	243	276	600	700	684.	670.	735.	752.
TI	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
TOC	9.00	10.0	23.0	25.0	6.00	6.00	7.50	8.20
TSS105	--	165	--	--	--	445.	--	--
U	<0.0500	<0.0200	0.0200	<0.0500	<0.0600	<0.0600	<0.200	<0.200
V	<1.00	<1.00	<0.0100	0.0200	<0.0100	0.0600	<0.0500	<0.0500
ZN	<0.0200	0.0400	<0.0200	<0.0200	<0.0200	0.0300	<0.0200	0.0300

* Unfiltered sample dated one day after actual sampling.

Table B2 (Cont)

Chemical Characteristics of Canada Brick Quarry Surface Water

Location SPF

Date	870625	870626*	871008	871009*	880425	880831	880901*
AG	<0.0005	<0.0005	<0.0005	<0.0005	--	<0.0001	<0.0001
AL	<1.00	<1.00	<1.00	<1.00	--	<0.0600	<0.0600
ALKCO3	<5.00	<5.00	<5.00	9.90	<5.00	<5.00	<5.00
ALKHCO3	174.	171.	86.0	80.1	221.	220.	220.
ALKOH	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
AS	<0.0010	<0.0010	<0.0010	<0.0010	--	<0.0010	<0.0010
B	0.440	0.440	4.04	4.07	0.900	0.800	0.900
BA	<2.00	<2.00	<5.00	<3.00	--	<3.00	4.20
BE	--	--	--	--	--	--	--
BR	0.500	<0.500	5.10	5.00	--	2.50	2.80
CA	90.0	91.0	190.	183.	147.	145.	105.
CD	<0.0001	<0.0001	<0.0002	<0.0002	--	<0.0001	<0.0001
CL	245.	232.	610.	610.	689.	430.	430.
CO	--	--	--	--	--	--	--
COND	142.	142.	298.	298.	--	208.	203.
CR	<0.100	<0.100	<0.100	<0.100	--	--	<0.0200
CR(VI)	--	<0.0050	<0.0050	<0.0050	--	<0.0100	<0.0100
CU	0.0040	0.0050	0.0030	0.0030	--	<0.0050	<0.0050
FE	<0.0500	0.550	<0.0500	0.260	--	<0.0200	0.0300
HARD	351.	354.	630.	616.	--	538.	438.
HG	<0.0002	<0.0002	<0.0002	<0.0002	--	<0.0001	<0.0001
I	<0.0500	<0.0500	<0.200	0.200	--	<0.500	<0.500
K	16.0	16.0	41.0	41.0	18.0	17.0	16.0
MG	31.0	31.0	38.0	39.0	58.0	43.0	43.0
MN	<0.0500	<0.500	<0.0500	<0.0500	--	<0.0100	0.0400
MO	<0.500	<0.500	1.00	1.00	--	<0.0300	<0.0300
NA	152.	148.	361.	375.	359.	233.	221.
NI	<0.0050	<0.0050	<0.0050	0.0050	--	<0.0100	<0.0100
NO3	6.80	6.90	13.5	13.6	--	10.6	10.7
PB	<0.0050	<0.0050	<0.0050	<0.0050	--	<0.0020	<0.0020
PH	8.40	8.40	8.37	8.44	8.10	8.30	8.30
SE	<0.0010	<0.0010	0.0120	0.0110	--	<0.0010	<0.0010
SIO2	5.55	5.30	1.85	2.75	--	2.40	2.70
SO4	154.	147.	919.	646.	246.	230.	230.
SR	1.59	1.66	4.70	4.60	3.00	2.70	2.75
TDS105	932.	924.	2080	2070	1590	1300	1290
TI	<1.00	<1.00	<1.00	<1.00	--	<0.0500	<0.0500
TOC	7.10	6.70	3.80	<0.500	--	2.30	2.10
TSS105	--	--	--	6.80	2.40	--	2.00
U	<0.0200	<0.0200	<0.0500	<0.0300	--	<0.0600	<0.0600
V	<0.0100	<0.0100	<0.0200	<0.0100	--	<0.0400	<0.0400
ZN	<0.0200	<0.200	0.0200	0.0200	--	<0.0100	0.0100

* Unfiltered sample dated one day after actual sampling.

Table B3

Chemical Characteristics of Canada Brick Quarry Surface Water

Location DSC

Date	800507	811130	820314	820324	820813	820827	820924	830921	830922*
AG	--	--	--	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
AL	--	--	--	--	<3.00	<0.200	<0.500	<0.500	<0.500
ALKCO3	--	--	<5.00	--	17.0	<5.00	13.0	15.0	27.0
ALKHCO3	--	--	36.0	--	92.0	66.0	121	121	110
ALKOH	--	--	<5.00	--	<5.00	<5.00	<5.00	<5.00	<5.00
AS	--	--	--	--	<0.0010	<0.0020	<0.0020	0.0010	0.0010
B	--	--	--	--	2.50	<0.500	<1.00	2.05	2.06
BA	--	--	--	--	<40.0	1.00	1.30	<2.00	<2.00
BE	--	--	--	--	<0.0002	<0.0002	<0.0002	--	--
BR	--	--	--	--	14.0	0.300	0.200	12.0	10.0
CA	--	--	15.0	--	262	44.0	70.0	214	208
CD	--	--	--	--	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
CL	--	--	26.0	--	1580	38.0	165	1200	1030
CO	--	--	--	--	--	--	<0.0500	--	--
COND	--	--	20.0	--	560	42.0	105	450	450
CR	--	--	--	--	<0.0500	0.0060	<0.0500	<0.100	<0.100
CR(VI)	--	--	--	--	0.0050	--	--	<0.0100	<0.0100
CU	--	--	--	--	0.0070	0.0070	0.0050	0.0040	0.0040
FE	--	--	--	--	<0.0500	<0.0500	<0.100	<0.0500	0.360
HARD	--	--	49.0	--	881	146	250	742	717
HG	--	--	--	--	<0.0002	0.0002	<0.0002	<0.0002	<0.0002
I	--	--	--	--	<1.00	<0.0500	<0.0500	<0.0200	<0.0200
K	--	--	3.90	--	38.0	4.20	9.50	35.0	35.0
MG	--	--	2.70	--	55.0	8.80	18.0	48.0	48.0
MN	--	--	--	--	<0.0200	<0.0200	<0.0200	<0.0500	0.0400
MO	--	--	--	--	<0.500	<0.500	<0.500	<0.500	<0.500
NA	--	--	14.0	--	835	2.70	98.0	640	640
NI	--	--	--	--	0.0120	<0.0050	0.0050	<0.0050	<0.0050
NO3	--	--	--	--	13.0	21.0	8.00	11.0	9.73
PB	--	--	--	--	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
PH	--	--	7.20	--	8.10	7.90	8.20	8.20	8.20
SE	--	--	--	--	0.0220	<0.0020	<0.0020	0.0030	0.0030
SIO2	--	--	--	--	2.30	2.40	6.40	4.88	4.36
SO4	--	--	14.0	--	450	61.0	110	330	320
SR	--	--	--	--	5.50	0.200	0.590	2.85	2.85
TDS105	--	--	--	--	3410	262	590	2800	2860
TI	--	--	--	--	<10.0	<1.00	<1.00	<1.00	<1.00
TOC	--	--	--	--	10.0	9.00	16.0	7.00	7.00
TSS105	--	--	--	--	--	--	53.0	11.0	11.0
U	--	--	--	--	<0.300	<0.0200	<0.0010	<0.0500	<0.0500
V	--	--	--	--	<0.100	0.0030	<0.500	<0.0200	<0.0200
ZN	--	--	--	--	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200

* Unfiltered sample dated one day after actual sampling.

Table B3 (Cont)

Chemical Characteristics of Canada Brick Quarry Surface Water

Location DSC

Date	831017	831018*	840217	840218*	840930	841001*	850702	850703*
AG	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0013	0.0020
AL	<0.500	13.0	0.500	10.0	<0.500	2.80	<1.00	<1.00
ALKCO3	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
ALKHCO3	75.0	91.0	40.0	52.0	104	108	137	138
ALKOH	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
AS	0.0040	<0.0010	<0.0010	0.0020	<0.0010	<0.0010	<0.0010	<0.0010
B	0.180	0.190	0.0600	0.0600	0.160	0.230	3.19	3.19
BA	<1.00	<1.00	<1.00	<1.00	<2.00	<2.00	<7.00	<5.00
BE	--	--	--	--	--	--	--	--
BR	0.150	0.190	<0.100	<0.100	0.700	0.300	13.0	12.0
CA	33.0	38.0	22.1	35.0	51.1	41.5	267	263
CD	0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0003	<0.0003
CL	40.0	39.0	64.9	68.1	140	133	1340	1470
CO	--	--	--	--	--	--	--	--
COND	37.6	37.8	36.0	38.0	74.0	74.0	500	500
CR	<0.100	<0.100	<0.0500	<0.0500	<0.100	<0.100	<0.100	<0.100
CR(VI)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0050	<0.0050
CU	0.0030	0.0140	0.0030	0.0190	0.0040	0.0080	0.0100	0.0040
FE	0.110	20.0	0.0600	17.5	<0.100	1.57	<0.0500	0.0950
HARD	111	184	74.0	164	180	159	892	891
HG	<0.0002	<0.0002	<0.0002	<0.0002	0.0010	0.0007	0.0002	0.0002
I	<0.0050	<0.0050	<0.0500	<0.0500	<0.0600	0.350	<0.200	<0.100
K	5.90	8.10	3.40	9.70	6.96	8.18	43.2	39.8
MG	7.20	13.0	4.60	11.1	12.9	13.7	54.9	57.0
MN	<0.0500	0.420	0.0700	0.490	<0.0500	<0.0500	<0.0500	<0.0500
MO	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	1.45	1.45
NA	28.0	28.0	39.0	37.0	78.9	61.9	712	719
NI	<0.0050	0.0120	<0.0050	0.0100	<0.0050	<0.0050	<0.0100	<0.0100
NO3	1.20	2.13	3.87	4.88	0.180	0.130	--	85.1
PB	0.0020	0.0160	<0.0020	0.0110	<0.0020	<0.0020	<0.0050	<0.0050
PH	8.10	7.80	7.40	7.60	7.80	7.70	8.30	8.30
SE	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0030	0.0030
SIO2	4.24	4.00	2.94	103	2.70	11.5	3.41	3.56
SO4	40.0	41.0	20.1	19.5	54.0	53.4	788	880
SR	0.220	0.280	0.120	0.170	0.500	0.970	6.01	6.01
TDS105	240	250	228	246	466	462	3310	3270
TI	<1.00	<1.00	<1.00	<1.00	<1.00	1.30	<1.00	<1.00
TOC	12.0	13.0	12.2	12.7	24.0	26.0	23.5	22.0
TSS105	--	24.0	--	630	--	--	--	24.1
U	<0.0500	<0.0500	<0.0100	<0.0100	<0.0500	<0.0500	<0.100	<0.100
V	<0.0050	0.0180	<0.0050	0.0700	<0.0100	<0.0100	<0.100	<0.0500
ZN	<0.0200	0.0700	<0.0200	0.0500	<0.0200	<0.0200	<0.0200	<0.0200

* Unfiltered sample dated one day after actual sampling.

Table B3 (Cont)

Chemical Characteristics of Canada Brick Quarry Surface Water

Location DSC

Date	851005	851006*	860618	860619*	861008	861009*	870403	870404*
AG	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002
AL	<1.00	2.90	<1.00	2.70	<1.00	8.00	<1.00	5.40
ALKCO3	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
ALKHCO3	91.0	92.0	186	188	130.	130.	135.	142.
ALKOH	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
AS	0.0020	0.0030	<0.0010	<0.0010	<0.0010	0.0030	<0.0010	0.0017
B	0.230	0.290	0.270	0.290	1.15	1.16	0.200	0.230
BA	<0.500	<0.500	<0.500	<0.500	<8.00	<8.00	<15.0	<15.0
BE	--	--	--	--	--	--	--	--
BR	<0.100	0.400	0.500	0.600	1.30	1.10	<5.00	<10.0
CA	42.9	43.9	73.5	75.0	84.0	90.0	67.0	77.0
CD	<0.0001	<0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	0.0002
CL	54.8	56.6	217	213	162.	160.	222.	233.
CO	--	--	--	--	--	--	--	--
COND	48.5	48.5	123	123	113.	115.	112.	112.
CR	<0.100	0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
CR(VI)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0050	<0.0050
CU	0.0030	0.0060	0.0140	0.0140	0.0080	0.0360	0.0040	0.0140
FE	0.0500	2.49	<0.0500	2.00	<0.0500	11.0	<0.100	11.0
HARD	146	152	270	280	286.	312.	249.	286.
HG	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	0.0002
I	<0.0500	<0.0700	<0.100	<0.300	<0.200	<0.200	<0.500	<0.500
K	5.98	6.25	6.10	7.20	16.0	17.0	5.70	6.30
MG	9.46	10.5	21.2	22.5	18.5	21.5	20.0	23.0
MN	<0.0500	0.0500	<0.0500	<0.0500	<0.0500	0.210	0.0500	0.220
MO	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
NA	42.7	39.7	129	132	114.	114.	124.	123.
NI	<0.0050	0.0060	<0.0050	0.0050	<0.0050	0.0300	<0.0050	0.0050
NO3	3.49	3.96	2.71	2.71	3.61	3.83	4.74	4.94
PB	<0.0020	<0.0020	<0.0050	<0.0050	<0.0050	<0.0050	<0.0020	<0.0020
PH	7.60	7.40	8.30	8.10	8.40	8.20	8.32	8.11
SE	0.0020	0.0040	<0.0010	<0.0010	0.0060	0.0110	0.0013	<0.0010
SIO2	1.10	11.7	2.35	--	4.40	4.95	5.05	22.4
SO4	57.2	57.3	85.0	78.0	224.	230.	102.	105.
SR	0.290	0.430	0.720	0.780	1.45	1.37	0.710	0.730
TDS105	266	283	600	630	694.	656.	703.	735.
TI	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
TOC	9.00	11.0	23.0	28.0	7.00	7.00	7.50	8.30
TSS105	--	11.0	--	--	--	626.	--	--
U	<0.0500	<0.0200	0.0200	<0.0200	<0.0600	<0.0600	<0.200	<0.200
V	<1.00	<1.00	<0.0100	<0.0200	<0.0100	0.0700	<0.0500	0.0700
ZN	<0.0200	0.0200	<0.0200	<0.0200	<0.0200	0.0200	<0.0200	0.0400

* Unfiltered sample dated one day after actual sampling.

Table B3 (Cont)

Chemical Characteristics of Canada Brick Quarry Surface Water

Location DSC

Date	870625	870626*	871008	871009*	880425	880831	880901*
AG	<0.0005	<0.0005	<0.0005	<0.0005	--	<0.0001	<0.0001
AL	<1.00	<1.00	<1.00	<1.00	--	<0.0600	<0.0600
ALKCO3	<5.00	<5.00	<5.00	<5.00	--	<5.00	<5.00
ALKHCO3	175.	172.	101.	100.	--	215.	215.
ALKOH	<5.00	<5.00	<5.00	<5.00	--	<5.00	<5.00
AS	<0.0010	<0.0010	<0.0010	<0.0010	--	<0.0010	<0.0010
B	0.450	0.450	3.66	3.68	--	0.800	0.900
BA	<2.00	<2.00	<5.00	3.00	--	<3.00	3.70
BE	--	--	--	--	--	--	--
BR	0.500	<0.500	4.70	5.00	--	2.80	2.90
CA	91.0	92.0	183.	170.	--	143.	112.
CD	<0.0001	<0.0001	<0.0002	<0.0002	--	<0.0001	<0.0001
CL	239.	227.	455.	455.	--	430.	430.
CO	--	--	--	--	--	--	--
COND	142.	144.	284.	284.	--	199.	208.
CR	<0.100	<0.100	<0.100	<0.100	--	<0.0200	<0.0200
CR(VI)	--	<0.0050	<0.0050	<0.0050	--	<0.0100	<0.0100
CU	0.0040	0.0050	0.0030	0.0030	--	<0.0050	<0.0050
FE	<0.0500	0.400	<0.0500	0.230	--	<0.0200	0.350
HARD	347.	352.	628.	597.	--	529.	451.
HG	<0.0002	<0.0002	<0.0002	<0.0002	--	<0.0001	<0.0001
I	<0.0500	0.0500	<0.200	<0.100	--	<0.500	<0.500
K	17.0	17.0	38.0	38.0	--	17.0	15.0
MG	30.0	30.0	42.0	42.0	--	42.0	42.0
MN	<0.0500	<0.500	<0.0500	<0.0500	--	<0.0100	0.0100
MO	<0.500	<0.500	1.00	1.00	--	<0.0300	<0.0300
NA	150.	147.	343.	348.	--	228.	224.
NI	<0.0050	<0.0050	<0.0050	0.0050	--	<0.0100	<0.0100
NO3	7.20	7.20	12.9	12.8	--	10.5	10.4
PB	<0.0050	<0.0050	<0.0050	<0.0050	--	<0.0020	<0.0020
PH	8.30	8.40	8.33	8.38	--	8.30	8.20
SE	<0.0010	0.0017	0.0110	0.0100	--	<0.0010	<0.0010
SIO2	6.20	5.10	2.10	2.50	--	2.70	3.20
SO4	158.	149.	575.	646.	--	230.	230.
SR	1.60	1.69	4.40	4.40	--	2.70	2.74
TDS105	920.	910.	1990	1980	--	1300	1290
TI	<1.00	<1.00	<1.00	<1.00	--	<0.0500	<0.0500
TOC	6.60	6.90	<0.500	<0.500	--	2.60	2.10
TSS105	--	--	--	7.60	--	--	25.0
U	<0.0200	<0.0200	<0.0500	<0.0300	--	<0.0600	<0.0600
V	<0.0100	<0.0100	<0.0200	<0.0100	--	<0.0400	<0.0400
ZN	<0.0200	<0.200	0.0200	0.0200	--	<0.0100	0.0200

* Unfiltered sample dated one day after actual sampling.

Table B4

Chemical Characteristics of Canada Brick Quarry Surface Water

Location PSB

Date	800507	811130	820314	820324	820813	820827	820924	830921	830922*
AG	--	<0.0002	--	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
AL	--	<0.200	--	<0.200	<0.600	<0.200	<0.500	<0.500	<0.500
ALKCO3	--	--	--	<5.00	19.0	<5.00	9.00	22.0	27.0
ALKHCO3	--	110	--	86.0	160	65.0	133	127	122
ALKOH	--	--	--	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
AS	--	0.0010	--	<0.0010	<0.0010	<0.0020	<0.0020	0.0010	0.0010
B	--	<0.500	--	<1.00	<0.500	<0.500	<1.00	1.66	1.71
BA	--	<1.00	--	<2.00	<8.00	1.00	1.40	<2.00	<2.00
BE	--	--	--	--	<0.0002	<0.0002	<0.0002	--	--
BR	--	0.100	--	<0.200	1.60	0.300	0.600	11.0	10.0
CA	--	58.0	--	34.0	97.0	43.0	70.0	220	223
CD	--	0.0010	--	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
CL	--	46.0	--	50.0	242	38.0	165	1100	1060
CO	--	--	--	--	--	--	<0.0500	--	--
COND	--	48.0	--	39.0	141	41.0	79.0	420	420
CR	--	<0.100	--	<0.0500	<0.0500	0.0040	<0.0500	<0.100	<0.100
CR(VI)	--	0.0050	--	0.0070	0.0040	--	--	<0.0100	<0.0100
CU	--	0.0030	--	0.0050	0.0130	0.0120	0.0070	0.0050	0.0040
FE	--	<0.0500	--	0.0500	<0.0500	<0.0500	<0.100	<0.0500	0.230
HARD	--	211	--	120	333	143	250	759	770
HG	--	--	--	<0.0002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002
I	--	<0.0100	--	<0.0200	<0.200	<0.0500	<0.0500	<0.0200	<0.0200
K	--	5.80	--	4.70	11.0	4.20	6.20	29.0	29.0
MG	--	16.0	--	8.10	22.0	8.70	18.0	51.0	52.0
MN	--	<0.0200	--	<0.100	<0.0200	<0.0200	<0.0200	<0.0500	<0.0500
MO	--	<0.500	--	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
NA	--	26.0	--	30.0	173	2.70	55.0	570	570
NI	--	<0.0050	--	<0.0050	<0.0050	<0.0050	0.0100	<0.0050	<0.0050
NO3	--	0.500	--	0.100	3.00	20.0	8.00	7.90	7.68
PB	--	0.0090	--	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
PH	--	8.10	--	7.90	8.30	7.90	8.00	8.30	8.20
SE	--	<0.0010	--	<0.0010	0.0040	<0.0020	<0.0020	0.0020	0.0020
SIO2	--	15.0	--	2.60	3.70	4.10	6.20	5.62	5.09
SO4	--	74.0	--	24.0	175	59.0	140	310	290
SR	--	0.130	--	0.140	1.12	0.200	0.400	2.50	2.50
TDS105	--	370	--	236	848	242	490	2700	2730
TI	--	<0.500	--	<1.00	<2.00	<1.00	<1.00	<1.00	<1.00
TOC	--	--	--	14.0	17.0	10.0	16.0	5.00	2.00
TSS105	--	48.0	--	--	--	--	34.0	7.00	7.00
U	--	<0.0100	--	<0.0100	<0.0600	<0.0200	<0.0010	<0.0500	<0.0500
V	--	<0.0050	--	<0.0100	<0.0200	<0.0030	<0.500	<0.0200	<0.0200
ZN	--	<0.0200	--	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200

* Unfiltered sample dated one day after actual sampling.

Table B4 (Cont)

Chemical Characteristics of Canada Brick Quarry Surface Water

Location PSB

Date	831017	831018*	840217	840218*	840930	841001*	850702	850703*
AG	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
AL	<0.500	13.0	<0.500	12.0	<0.500	1.80	<1.00	<1.00
ALKCO3	<5.00	<5.00	<5.00	<5.00	12.0	<5.00	<5.00	<5.00
ALKHCO3	72.0	87.0	40.0	55.0	129	140	160	161
ALKOH	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
AS	0.0030	<0.0010	<0.0010	0.0030	<0.0010	<0.0010	<0.0010	<0.0010
B	0.200	0.150	0.0700	0.0600	0.330	0.350	2.45	2.44
BA	<1.00	<1.00	<1.00	<1.00	<2.00	<2.00	<6.00	<5.00
BE	--	--	--	--	--	--	--	--
BR	0.210	<0.0500	<0.100	<0.100	0.900	0.600	10.0	9.00
CA	30.0	38.0	22.6	41.0	63.5	66.5	239	236
CD	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0003	<0.0003
CL	36.0	35.0	65.4	66.7	140	138	1070	1080
CO	--	--	--	--	--	--	--	--
COND	35.0	35.2	36.0	38.0	86.0	86.0	440	440
CR	<0.100	<0.100	<0.0500	<0.0500	<0.100	<0.100	<0.100	<0.100
CR(VI)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0050	<0.0050
CU	0.0030	0.0140	0.0030	0.0230	0.0040	0.0060	0.0100	0.0060
FE	0.380	20.0	0.0600	21.6	<0.100	1.08	<0.0500	0.395
HARD	93.0	184	75.0	194	223	235	805	804
HG	<0.0002	<0.0002	<0.0002	<0.0002	0.0008	0.0006	0.0003	<0.0002
I	<0.0050	<0.0050	<0.0500	<0.0500	<0.0600	<0.0600	<0.200	<0.100
K	5.90	7.90	3.50	8.70	9.21	10.3	34.1	31.8
MG	6.70	13.0	4.60	13.0	15.8	16.7	50.9	52.3
MN	<0.0500	0.400	0.0800	0.650	<0.0050	<0.0500	<0.0500	<0.0500
MO	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	1.00	1.00
NA	27.0	28.0	40.0	38.0	87.4	86.6	605	615
NI	<0.0050	0.0120	<0.0050	0.0100	<0.0050	<0.0050	<0.0100	<0.0100
NO3	1.78	2.00	3.94	5.01	0.180	0.130	--	70.0
PB	0.0020	0.0170	<0.0020	0.0230	<0.0020	<0.0020	<0.0050	<0.0050
PH	8.00	7.80	7.50	7.60	8.00	7.80	8.30	8.20
SE	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0020	0.0020
SIO2	3.66	3.66	3.39	126	5.30	8.30	1.55	3.86
SO4	38.0	37.0	18.6	19.5	74.0	81.0	599	608
SR	0.220	0.270	0.120	0.200	1.07	1.00	5.00	5.00
TDS105	220	230	228	250	520	516	2830	2790
TI	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
TOC	13.0	12.0	11.5	10.6	25.0	27.0	21.0	26.0
TSS105	--	75.0	--	920	--	--	--	1.60
U	<0.0500	<0.0500	<0.0100	<0.0100	<0.0500	<0.0500	<0.100	<0.100
V	<0.0050	0.0110	<0.0050	0.0800	<0.0100	<0.0100	<0.100	<0.0500
ZN	<0.0200	0.0700	<0.0200	0.100	<0.0200	<0.0200	<0.0200	<0.0200

* Unfiltered sample dated one day after actual sampling.

Table B4 (Cont)

Chemical Characteristics of Canada Brick Quarry Surface Water

Location PSB

Date	851005	851006*	860618	860619*	861008	861009*	870403	870404*
AG	<0.0002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002
AL	<1.00	2.70	<1.00	3.90	<1.00	2.60	<1.00	3.20
ALKCO3	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
ALKHCO3	90.0	107	203	205	133.	132.	139.	141.
ALKOH	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00	<5.00
AS	0.0010	0.0030	<0.0010	<0.0010	<0.0010	0.0020	0.0010	0.0021
B	0.220	0.250	0.270	0.320	0.950	0.980	0.190	0.240
BA	<0.500	<0.500	<0.500	<0.500	<8.00	<8.00	<15.0	<15.0
BE	--	--	--	--	--	--	--	--
BR	0.100	0.200	0.500	0.800	1.60	1.30	<5.00	<10.0
CA	50.3	52.6	80.0	82.0	80.0	80.0	69.0	75.0
CD	<0.0001	<0.0001	<0.0002	<0.0002	<0.0002	<0.0002	<0.0001	0.0002
CL	62.3	63.1	217	214	142.	150.	222.	240.
CO	--	--	--	--	--	--	--	--
COND	54.5	55.0	124	125	105.	108.	114.	118.
CR	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
CR(VI)	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0050	<0.0050
CU	0.0050	0.0060	0.0120	0.0140	0.0070	0.0230	0.0040	0.0100
FE	0.100	2.56	<0.0500	3.00	<0.0500	4.50	<0.100	6.50
HARD	170	6.73	293	305	272.	278.	254.	277.
HG	<0.0002	0.0006	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	0.0003
I	<0.0500	<0.0500	<0.100	<0.300	<0.200	<0.200	<0.500	<0.500
K	6.31	181	7.30	8.70	14.0	14.0	5.90	6.30
MG	10.9	12.2	22.7	24.2	17.5	19.0	20.0	22.0
MN	<0.0500	0.0500	<0.0500	0.0700	<0.0500	0.0900	<0.0500	0.140
MO	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
NA	45.1	44.2	134	135	100.	104.	126.	130.
NI	0.0050	<0.0050	<0.0050	0.0050	<0.0050	0.0110	<0.0050	0.0050
NO3	4.38	4.24	5.81	6.14	4.56	4.44	6.20	6.40
PB	<0.0020	<0.0020	<0.0050	<0.0050	<0.0050	<0.0050	<0.0020	<0.0020
PH	7.50	7.60	8.20	8.10	8.30	8.10	8.34	8.11
SE	0.0030	0.0020	<0.0010	0.0020	0.0050	0.0040	0.0010	0.0010
SIO2	0.270	3.37	5.80	6.85	4.45	4.75	4.25	18.3
SO4	64.2	64.3	105	95.0	186.	193.	96.0	98.0
SR	0.170	0.190	0.950	0.940	1.29	1.61	0.760	0.750
TDS105	326	304	590	680	624.	656.	693.	743.
TI	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00	<1.00
TOC	11.0	12.0	26.0	28.0	8.00	6.00	8.20	8.10
TSS105	--	5.00	--	--	--	260.	--	--
U	<0.0500	0.0300	0.0200	0.0400	<0.0600	<0.0600	<0.200	<0.200
V	<1.00	<1.00	<0.0100	<0.0200	<0.0100	0.0200	<0.0500	<0.0500
ZN	<0.0200	0.0200	0.0400	0.190	<0.0200	0.140	<0.0200	0.0200

* Unfiltered sample dated one day after actual sampling.

Table B4 (Cont)

Chemical Characteristics of Canada Brick Quarry Surface Water

Location PSB

Date	870625	870626*	871008	871009*	880425	880831	880901*
AG	<0.0005	<0.0005	<0.0005	<0.0005	--	<0.0001	<0.0001
AL	<1.00	<1.00	<1.00	<1.00	--	<0.0600	<0.0600
ALKCO3	<5.00	<5.00	<5.00	<5.00	--	<5.00	<5.00
ALKHCO3	212.	208.	200.	200.	--	243.	245.
ALKOH	<5.00	<5.00	<5.00	<5.00	--	<5.00	<5.00
AS	<0.0010	<0.0010	<0.0010	<0.0010	--	<0.0010	<0.0010
B	0.450	0.470	1.27	1.28	--	0.800	0.800
BA	<2.00	<2.00	<5.00	<3.00	--	<3.00	<3.00
BE	--	--	--	--	--	--	--
BR	0.600	0.500	3.30	3.00	--	2.10	2.20
CA	100.	98.0	126.	117.	--	130.	118.
CD	<0.0001	<0.0001	<0.0002	<0.0002	--	<0.0001	<0.0001
CL	228.	223.	397.	397.	--	405.	400.
CO	--	--	--	--	--	--	--
COND	145.	143.	214.	214.	--	195.	198.
CR	<0.100	<0.100	<0.100	<0.100	--	<0.0200	<0.0200
CR(VI)	--	<0.0050	<0.0050	<0.0050	--	<0.0100	<0.0100
CU	0.0040	0.0040	0.0030	0.0030	--	<0.0050	<0.0050
FE	<0.0500	0.270	<0.0500	0.300	--	<0.0200	0.100
HARD	373.	371.	499.	477.	--	492.	462.
HG	<0.0002	<0.0002	<0.0002	<0.0002	--	<0.0001	<0.0001
I	<0.0500	0.0600	<0.200	<0.100	--	<0.500	<0.500
K	17.0	17.0	18.0	18.0	--	18.0	18.0
MG	30.0	30.0	45.0	45.0	--	41.0	41.0
MN	<0.0500	<0.500	<0.0500	<0.0500	--	<0.0100	<0.0100
MO	<0.500	<0.500	<0.500	<0.500	--	<0.0300	<0.0300
NA	146.	143.	242.	240.	--	226.	215.
NI	<0.0050	<0.0050	<0.0050	<0.0050	--	<0.0100	<0.0100
NO3	9.10	9.10	7.84	7.85	--	11.8	11.7
PB	<0.0050	<0.0050	<0.0050	<0.0050	--	<0.0020	<0.0020
PH	8.30	8.30	8.39	8.34	--	8.20	8.20
SE	<0.0010	<0.0010	0.0050	0.0030	--	<0.0010	<0.0010
SIO2	6.50	6.15	4.00	4.30	--	5.20	5.50
SO4	142.	145.	268.	237.	--	230.	260.
SR	2.00	2.00	2.60	2.70	--	2.70	2.97
TDS105	918.	912.	1390	1400	--	1260	1260
TI	<1.00	<1.00	<1.00	<1.00	--	<0.0500	<0.0500
TOC	6.00	6.50	3.60	3.40	--	2.30	2.20
TSS105	--	--	--	11.2	--	--	3.00
U	<0.0200	<0.0200	0.0500	<0.0300	--	<0.0600	<0.0600
V	<0.0100	<0.0100	<0.0200	<0.0100	--	<0.0400	<0.0400
ZN	<0.0200	<0.200	0.0200	0.0200	--	<0.0100	0.0100

* Unfiltered sample dated one day after actual sampling.

APPENDIX C

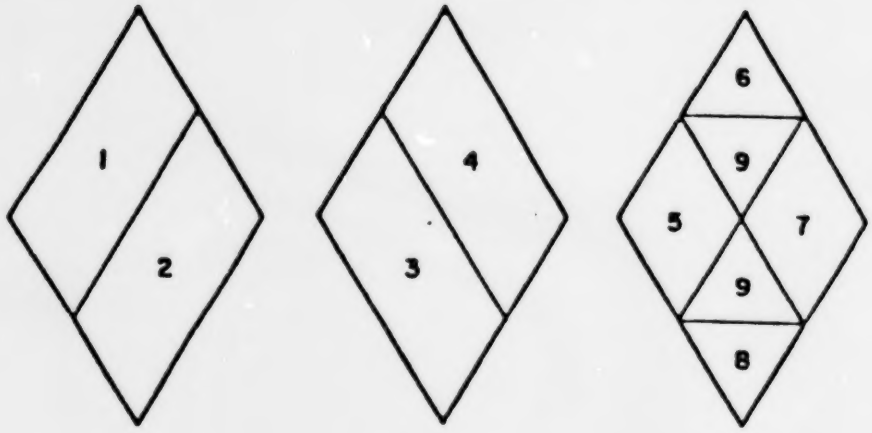
CANADA BRICK QUARRY SURFACE WATER SURVEY
(MARY FIX CREEK)
1980-1988

Sampling Locations

CPO - CP Overpass
SPF - South Property Fence
DSC - Dundas Street Culverty
PSB - Paisley Street Bridge

EPM - equivalents per million

GUIDE TO PIPER INTERPRETATION



Water types on a trilinear diagram:

area 1 – $(Ca^{+2} + Mg^{+2}) > (Na^{+} + K^{+})$;

area 2 – $(Ca^{+2} + Mg^{+2}) < (Na^{+} + K^{+})$;

area 3 – $(HCO_3^{-} + CO_3^{-2}) > (Cl^{-} + SO_4^{-2})$;

area 4 – $(HCO_3^{-} + CO_3^{-2}) < (Cl^{-} + SO_4^{-2})$;

area 5 – carbonate hardness (secondary alkalinity) > 50%;

area 6 – noncarbonate hardness (secondary salinity) > 50%;

area 7 – noncarbonate alkali (primary salinity) > 50%;

area 8 – carbonate alkali (primary alkalinity) > 50%;

area 9 – no dominant cation-anion pair.

Table C1

Major Ion Chemistry
Canada Brick Quarry Surface Water
Location CPO

Cations

Date	Number	Calcium			Magnesium			Sodium			Potassium			Total Ions (EPM)		
		mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	Cation	Anion	
800507	1	81.00	4.04	45.86	24.40	2.01	22.78	60.00	2.61	29.61	6.00	0.15	1.74	8.81	9.58	
811130	2	57.00	2.84	55.16	16.00	1.32	25.53	20.00	0.87	16.87	4.90	0.13	2.43	5.16	4.78	
820314	3	15.00	0.75	42.37	2.70	0.22	12.58	16.00	0.70	39.40	3.90	0.10	5.65	1.77	1.74	
820324	4	34.00	1.70	46.30	8.30	0.68	18.64	27.00	1.17	32.05	4.30	0.11	3.00	3.66	3.95	
820813	5	116.00	5.79	44.84	34.00	2.80	21.68	97.00	4.22	32.69	4.00	0.10	0.79	12.91	13.19	
820827	6	43.00	2.15	62.27	8.40	0.69	20.06	12.00	0.52	15.15	3.40	0.09	2.52	3.45	2.92	
820924	7	72.00	3.59	53.80	18.00	1.48	22.18	34.00	1.48	22.15	4.90	0.13	1.88	6.68	7.31	
830921	8	89.00	4.44	47.46	22.00	1.81	19.35	71.00	3.09	33.01	0.66	0.02	0.18	9.36	9.14	
830922	9	88.00	4.39	46.77	23.00	1.89	20.16	71.00	3.09	32.89	0.67	0.02	0.18	9.39	9.40	
831017	10	29.00	1.45	52.86	5.70	0.47	17.13	16.00	0.70	25.42	4.90	0.13	4.58	2.74	2.58	
831018	11	31.00	1.55	50.79	7.80	0.64	21.07	16.00	0.70	22.85	6.30	0.16	5.29	3.05	2.64	
840217	12	21.40	1.07	35.32	4.30	0.35	11.70	35.00	1.52	50.35	3.10	0.08	2.62	3.02	2.83	
840218	13	26.90	1.34	37.31	7.70	0.63	17.61	33.00	1.44	39.89	7.30	0.19	5.19	3.60	3.15	
840930	14	34.70	1.73	39.67	12.20	1.00	23.00	34.60	1.51	34.48	4.87	0.12	2.85	4.37	5.75	*
841001	15	46.10	2.30	41.46	12.50	1.03	18.54	47.80	2.08	37.47	5.49	0.14	2.53	5.55	5.72	
850702	16	130.00	6.49	27.61	40.70	3.35	14.26	310.00	13.48	57.40	6.75	0.17	0.73	23.49	25.53	
850703	17	129.00	6.44	27.27	41.20	3.39	14.36	313.00	13.61	57.67	6.48	0.17	0.70	23.61	23.43	
851005	18	39.10	1.95	48.05	8.93	0.73	18.10	28.90	1.26	30.96	4.61	0.12	2.90	4.06	4.17	
851006	19	40.90	2.04	47.89	9.96	0.82	19.23	29.30	1.27	29.91	4.95	0.13	2.97	4.26	3.77	
860618	20	74.00	3.69	36.30	21.70	1.79	17.55	105.00	4.57	44.89	5.00	0.13	1.26	10.17	10.60	
860619	21	88.00	4.39	37.27	32.50	2.67	22.70	104.00	4.52	38.40	7.50	0.19	1.63	11.78	10.63	
861008	22	69.00	3.44	42.33	19.50	1.60	19.73	67.00	2.91	35.83	6.70	0.17	2.11	8.13	8.19	
861009	23	138.00	6.89	51.89	38.00	3.13	23.56	69.00	3.00	22.62	10.00	0.26	1.93	13.27	8.92	*
870403	24	69.00	3.44	33.13	20.00	1.65	15.84	119.00	5.18	49.80	5.00	0.13	1.23	10.39	11.01	
870404	25	72.00	3.59	33.40	21.00	1.73	16.06	122.00	5.31	49.33	5.10	0.13	1.21	10.76	11.59	
870625	26	100.00	4.99	34.75	35.00	2.88	20.05	141.00	6.13	42.71	14.00	0.36	2.49	14.36	13.67	
870626	27	100.00	4.99	34.65	36.00	2.96	20.57	140.00	6.09	42.29	14.00	0.36	2.49	14.40	13.39	
871008	28	105.00	5.24	26.46	48.00	3.95	19.95	234.00	10.18	51.40	17.00	0.43	2.20	19.80	20.81	
871009	29	107.00	5.34	26.17	52.00	4.28	20.97	238.00	10.35	50.73	17.00	0.43	2.13	20.41	20.82	
880425	30	162.00	8.08	29.99	60.00	4.94	18.31	311.00	13.53	50.18	16.00	0.41	1.52	26.96	27.58	
880831	31	173.00	8.63	39.61	48.00	3.95	18.12	203.00	8.83	40.51	15.00	0.38	1.76	21.80	22.74	
880901	32	150.00	7.49	35.78	48.00	3.95	18.88	208.00	9.05	43.25	17.00	0.43	2.08	20.92	22.55	

* Indicates that cations and anions do not lie within 10% of mean

Table C1 (cont)

Major Ion Chemistry
Canada Brick Quarry Surface Water
Location CPO

Anions

Date	Number	Chloride			Sulphate			Bicarbonate as CaCO3			Carbonate as CaCO3			Total Ions (EPM)		
		mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	Anion	Cation	
800507	1	136.00	3.84	40.04	81.00	1.69	17.60	201.00	4.02	41.94	2.00	0.04	0.42	9.58	8.81	
811130	2	40.00	1.13	23.58	70.00	1.46	30.46	110.00	2.20	45.96	0.00	0.00	0.00	4.78	5.16	
820314	3	26.00	0.73	42.04	14.00	0.29	16.71	36.00	0.72	41.25	<5.00	0.00	0.00	1.74	1.77	
820324	4	60.00	1.69	42.81	26.00	0.54	13.69	86.00	1.72	43.49	<5.00	0.00	0.00	3.95	3.66	
820813	5	177.00	4.99	37.86	140.00	2.91	22.11	240.00	4.80	36.39	24.00	0.48	3.64	13.19	12.91	
820827	6	22.00	0.62	21.25	49.00	1.02	34.94	64.00	1.28	43.81	<5.00	0.00	0.00	2.92	3.45	
820924	7	85.00	2.40	32.78	95.00	1.98	27.04	137.00	2.74	37.45	10.00	0.20	2.73	7.31	6.68	
830921	8	120.00	3.38	37.03	95.00	1.98	21.64	163.00	3.26	35.65	26.00	0.52	5.69	9.14	9.36	
830922	9	130.00	3.67	39.00	94.00	1.96	20.81	165.00	3.30	35.08	24.00	0.48	5.10	9.40	9.39	
831017	10	24.00	0.68	26.23	30.00	0.62	24.20	64.00	1.28	49.57	<5.00	0.00	0.00	2.58	2.74	
831018	11	24.00	0.68	25.64	29.00	0.60	22.87	68.00	1.36	51.49	<5.00	0.00	0.00	2.64	3.05	
840217	12	61.50	1.73	61.20	17.30	0.36	12.71	37.00	0.74	26.10	<5.00	0.00	0.00	2.83	3.02	
840218	13	66.10	1.86	59.28	18.30	0.38	12.11	45.00	0.90	28.60	<5.00	0.00	0.00	3.15	3.60	
840930	14	99.00	2.79	48.58	44.00	0.92	15.94	95.00	1.90	33.04	7.00	0.14	2.43	5.75	4.37	*
841001	15	98.00	2.76	48.34	43.00	0.90	15.66	103.00	2.06	36.01	<5.00	0.00	0.00	5.72	5.5	
850702	16	639.00	18.02	70.61	151.00	3.14	12.32	218.00	4.36	17.07	<5.00	0.00	0.00	25.53	23.49	
850703	17	572.00	16.13	68.87	140.00	2.91	12.44	219.00	4.38	18.69	<5.00	0.00	0.00	23.43	23.61	
851005	18	43.60	1.23	29.49	38.50	0.80	19.22	107.00	2.14	51.29	<5.00	0.00	0.00	4.17	4.06	
851006	19	42.20	1.19	31.54	37.70	0.78	20.80	90.00	1.80	47.67	<5.00	0.00	0.00	3.77	4.26	
860618	20	193.00	5.44	51.37	67.00	1.39	13.16	188.00	3.76	35.47	<5.00	0.00	0.00	10.60	10.17	
860619	21	192.00	5.42	50.94	70.00	1.46	13.71	188.00	3.76	35.35	<5.00	0.00	0.00	10.63	11.78	
861008	22	118.00	3.33	40.63	78.00	1.62	19.83	162.00	3.24	39.54	<5.00	0.00	0.00	8.19	8.13	
861009	23	120.00	3.38	37.97	112.00	2.33	26.16	160.00	3.20	35.88	<5.00	0.00	0.00	8.92	13.27	*
870403	24	220.00	6.21	56.38	99.00	2.06	18.73	137.00	2.74	24.89	<5.00	0.00	0.00	11.01	10.39	
870404	25	240.00	6.77	58.41	99.00	2.06	17.78	138.00	2.76	23.80	<5.00	0.00	0.00	11.59	10.76	
870625	26	233.00	6.57	48.07	149.00	3.10	22.69	200.00	4.00	29.24	<5.00	0.00	0.00	13.67	14.36	
870626	27	231.00	6.52	48.66	141.00	2.94	21.92	197.00	3.94	29.41	<5.00	0.00	0.00	13.39	14.40	
871008	28	432.00	12.19	58.55	203.00	4.23	20.31	220.00	4.40	21.14	<5.00	0.00	0.00	20.81	19.80	
871009	29	432.00	12.19	58.52	194.00	4.04	19.40	230.00	4.60	22.08	<5.00	0.00	0.00	20.82	20.41	
880425	30	600.00	16.92	61.35	247.00	5.14	18.64	276.00	5.52	20.00	<5.00	0.00	0.00	27.58	26.96	
880831	31	430.00	12.13	53.35	230.00	4.79	21.06	291.00	5.82	25.59	<5.00	0.00	0.00	22.74	21.80	
880901	32	430.00	12.13	53.79	220.00	4.58	20.32	292.00	5.84	25.89	<5.00	0.00	0.00	22.55	20.92	

* Indicates that cations and anions do not lie within 10% of mean

FIGURE 2

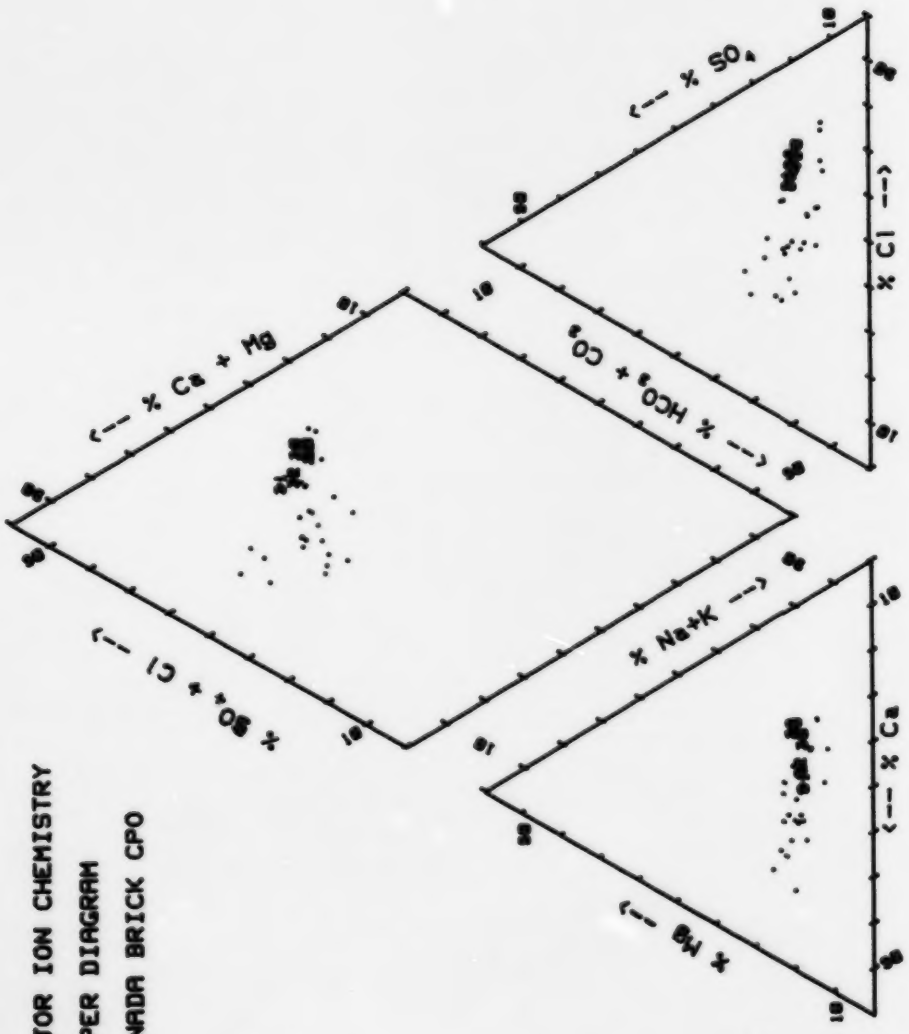

MAJOR ION CHEMISTRY
PIPER DIAGRAM
CANADA BRICK CPO
% SO4 + Cl
% Ca + Mg
% HCO3 + CO3
% Na+K
% SO4
% Cl
% Mg
% Ca

Table C2

Major Ion Chemistry
Canada Brick Quarry Surface Water
Location SPF

Cations

Date	Number	Calcium			Magnesium			Sodium			Potassium			Total Ions (EPM)		
		mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	Cation	Anion	
800507	1	79.00	3.94	45.84	22.80	1.88	21.82	61.00	2.65	30.85	5.00	0.13	1.49	8.60	8.98	
811130	2	57.00	2.84	52.38	16.00	1.32	24.25	26.00	1.13	20.83	5.40	0.14	2.54	5.43	4.88	
820314	3	17.00	0.85	41.41	3.30	0.27	13.26	19.00	0.83	40.34	4.00	0.10	4.99	2.05	2.05	
820324	4	33.00	1.65	45.13	8.10	0.67	18.27	28.00	1.22	33.38	4.60	0.12	3.22	3.65	3.69	
820813	5	259.00	12.92	22.44	54.00	4.44	7.72	900.00	39.15	67.98	42.00	1.07	1.87	57.59	59.58	
820827	6	45.00	2.25	70.52	8.60	0.71	22.22	2.90	0.13	3.96	4.10	0.10	3.29	3.18	3.73	
820924	7	72.00	3.59	36.32	18.00	1.48	14.97	105.00	4.57	46.17	9.80	0.25	2.53	9.89	11.74	
830921	8	207.00	10.33	24.35	46.00	3.79	8.92	630.00	27.40	64.61	35.00	0.90	2.11	42.41	43.34	
830922	9	208.00	10.38	24.15	47.00	3.87	9.00	640.00	27.84	64.77	35.00	0.90	2.08	42.98	41.38	
831017	10	29.00	1.45	44.09	6.10	0.50	15.29	27.00	1.17	35.78	6.20	0.16	4.83	3.28	3.12	
831018	11	40.00	2.00	39.51	20.00	1.65	32.58	27.00	1.17	23.25	9.20	0.24	4.66	5.05	3.62	*
840217	12	22.00	1.10	32.05	4.50	0.37	10.81	43.00	1.87	54.60	3.40	0.09	2.54	3.43	3.01	
840218	13	35.00	1.75	39.80	10.50	0.86	19.69	36.00	1.57	35.68	8.30	0.21	4.84	4.39	3.29	*
840930	14	35.70	1.78	38.32	7.50	0.62	13.27	49.40	2.15	46.22	3.98	0.10	2.19	4.65	6.63	*
841001	15	49.90	2.49	38.31	9.60	0.79	12.16	70.80	3.08	47.39	5.45	0.14	2.14	6.50	6.34	
850702	16	261.00	13.02	26.06	55.90	4.60	9.20	720.00	31.32	62.67	40.40	1.03	2.07	49.98	58.78	
850703	17	264.00	13.17	26.03	58.60	4.82	9.53	725.00	31.54	62.30	42.50	1.09	2.15	50.62	54.66	
851005	18	41.40	2.07	43.50	9.19	0.76	15.92	40.80	1.77	37.37	5.95	0.15	3.20	4.75	4.42	
851006	19	42.50	2.12	44.32	10.20	0.84	17.54	38.30	1.67	34.82	6.21	0.16	3.32	4.78	4.41	
860618	20	72.70	3.63	32.46	21.20	1.74	15.61	130.00	5.65	50.59	5.87	0.15	1.34	11.18	11.57	
860619	21	75.00	3.74	32.53	23.20	1.91	16.59	130.00	5.65	49.15	7.80	0.20	1.73	11.51	11.53	
861008	22	86.00	4.29	38.53	18.50	1.52	13.67	113.00	4.92	44.13	16.00	0.41	3.67	11.14	11.96	
861009	23	86.00	4.29	37.60	21.00	1.73	15.14	114.00	4.96	43.45	17.00	0.43	3.81	11.41	11.99	
870403	24	68.00	3.39	31.55	20.00	1.65	15.30	128.00	5.57	51.77	5.80	0.15	1.38	10.76	11.08	
870404	25	71.00	3.54	31.86	22.00	1.81	16.28	129.00	5.61	50.46	6.10	0.16	1.40	11.12	11.81	
870625	26	90.00	4.49	31.94	31.00	2.55	18.14	152.00	6.61	47.02	16.00	0.41	2.91	14.06	13.60	
870626	27	91.00	4.54	32.58	31.00	2.55	18.30	148.00	6.44	46.19	16.00	0.41	2.94	13.94	13.02	
871008	28	190.00	9.48	32.29	38.00	3.13	10.65	361.00	15.70	53.48	41.00	1.05	3.57	29.36	38.06	*
871009	29	183.00	9.13	30.75	39.00	3.21	10.81	375.00	16.31	54.92	41.00	1.05	3.53	29.70	32.46	
880425	30	147.00	7.34	26.03	58.00	4.77	16.93	359.00	15.62	55.41	18.00	0.46	1.63	28.18	28.97	
880831	31	145.00	7.24	33.90	43.00	3.54	16.58	233.00	10.13	47.48	17.00	0.43	2.04	21.34	21.32	
880901	32	105.00	5.24	27.87	43.00	3.54	18.82	221.00	9.61	51.13	16.00	0.41	2.18	18.80	21.32	

* Indicates that cations and anions do not lie within 10% of mean

Table C2 (cont)

Major Ion Chemistry
Canada Brick Quarry Surface Water
Location SPF

Anions

		Chloride			Sulphate			Bicarbonate as CaCO3			Carbonate as CaCO3			Total Ions (EPM)		
Date	Number	mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	Anion	Cation	
800507	1	122.00	3.44	38.34	78.00	1.62	18.09	190.00	3.80	42.32	5.60	0.11	1.25	8.98	8.60	
811130	2	42.00	1.18	24.26	72.00	1.50	30.70	110.00	2.20	45.04	0.00	0.00	0.00	4.88	5.43	
820314	3	34.00	0.96	46.78	14.00	0.29	14.22	40.00	0.80	39.01	<5.00	0.00	0.00	2.05	2.05	
820324	4	55.00	1.55	42.05	23.00	0.48	12.98	83.00	1.66	44.97	<5.00	0.00	0.00	3.69	3.65	
820813	5	1700.00	47.95	80.48	450.00	9.37	15.73	99.00	1.98	3.32	14.00	0.28	0.47	59.58	57.59	
820827	6	41.00	1.16	31.02	63.00	1.31	35.19	63.00	1.26	33.79	<5.00	0.00	0.00	3.73	3.18	
820924	7	215.00	6.06	51.65	145.00	3.02	25.71	120.00	2.40	20.43	13.00	0.26	2.21	11.74	9.89	
830921	8	1200.00	33.85	78.10	330.00	6.87	15.85	117.00	2.34	5.40	14.00	0.28	0.65	43.34	42.41	
830922	9	1130.00	31.87	77.02	330.00	6.87	16.60	107.00	2.14	5.17	25.00	0.50	1.21	41.38	42.98	
831017	10	35.00	0.99	31.66	38.00	0.79	25.38	67.00	1.34	42.96	<5.00	0.00	0.00	3.12	3.28	
831018	11	35.00	0.99	27.30	36.00	0.75	20.73	94.00	1.88	51.97	<5.00	0.00	0.00	3.62	5.05	*
840217	12	65.40	1.84	61.29	18.50	0.39	12.80	39.00	0.78	25.91	<5.00	0.00	0.00	3.01	3.43	
840218	13	66.60	1.88	57.16	19.60	0.41	12.42	50.00	1.00	30.42	<5.00	0.00	0.00	3.29	4.39	*
840930	14	125.00	3.53	53.21	50.00	1.04	15.71	94.00	1.88	28.36	9.00	0.18	2.72	6.63	4.65	*
841001	15	118.00	3.33	52.52	45.60	0.95	14.98	103.00	2.06	32.49	<5.00	0.00	0.00	6.34	6.50	
850702	16	1420.00	40.05	68.14	768.00	15.99	27.20	137.00	2.74	4.66	<5.00	0.00	0.00	58.78	49.98	
850703	17	1310.00	36.95	67.60	718.00	14.95	27.35	138.00	2.76	5.05	<5.00	0.00	0.00	54.66	50.62	
851005	18	51.10	1.44	32.64	58.40	1.22	27.53	88.00	1.76	39.83	<5.00	0.00	0.00	4.42	4.75	
851006	19	51.50	1.45	32.96	55.50	1.16	26.22	90.00	1.80	40.82	<5.00	0.00	0.00	4.41	4.78	
860618	20	215.00	6.06	52.40	85.00	1.77	15.29	187.00	3.74	32.30	<5.00	0.00	0.00	11.57	11.18	
860619	21	210.00	5.92	51.36	88.00	1.83	15.89	189.00	3.78	32.76	<5.00	0.00	0.00	11.53	11.51	
861008	22	162.00	4.57	38.22	229.00	4.77	39.88	131.00	2.62	21.90	<5.00	0.00	0.00	11.96	11.14	
861009	23	164.00	4.63	38.57	228.00	4.75	39.59	131.00	2.62	21.84	<5.00	0.00	0.00	11.99	11.41	
870403	24	222.00	6.26	56.49	102.00	2.12	19.16	135.00	2.70	24.35	<5.00	0.00	0.00	11.08	10.76	
870404	25	244.00	6.88	58.29	104.00	2.17	18.34	138.00	2.76	23.37	<5.00	0.00	0.00	11.81	11.12	
870625	26	245.00	6.91	50.83	154.00	3.21	23.58	174.00	3.48	25.59	<5.00	0.00	0.00	13.60	14.06	
870626	27	232.00	6.54	50.25	147.00	3.06	23.50	171.00	3.42	26.25	<5.00	0.00	0.00	13.02	13.94	
871008	28	610.00	17.21	45.21	919.00	19.13	50.27	86.00	1.72	4.52	<5.00	0.00	0.00	38.06	29.36	*
871009	29	610.00	17.21	53.01	646.00	13.45	41.44	80.10	1.60	4.93	9.90	0.20	0.61	32.46	29.70	
880425	30	689.00	19.43	67.07	246.00	5.12	17.68	221.00	4.42	15.25	<5.00	0.00	0.00	28.97	28.18	
880831	31	430.00	12.13	56.90	230.00	4.79	22.47	220.00	4.40	20.63	<5.00	0.00	0.00	21.32	21.34	
880901	32	430.00	12.13	56.90	230.00	4.79	22.47	220.00	4.40	20.63	<5.00	0.00	0.00	21.32	18.80	

* Indicates that cations and anions do not lie within 10% of mean

FIGURE 3

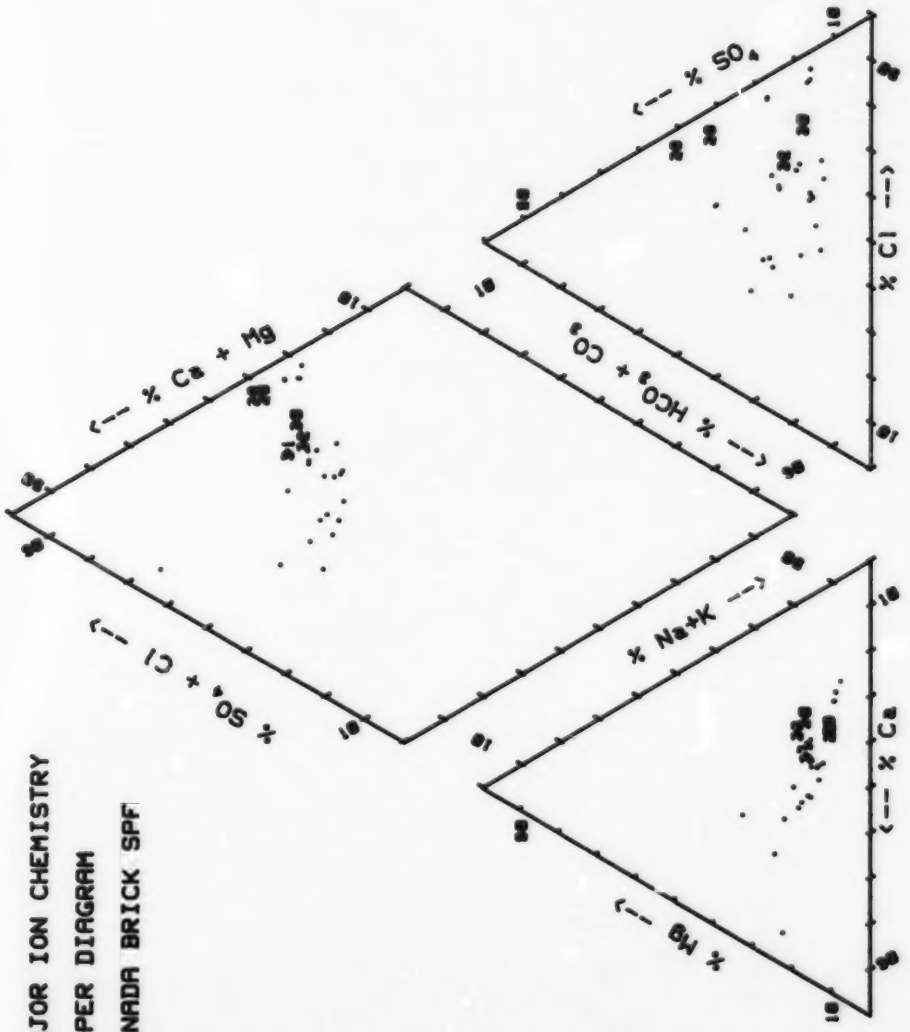

MAJOR ION CHEMISTRY
PIPER DIAGRAM
CANADA BRICK SPF
% SO4 + Cl
% Ca + Mg
% HCO3 + CO3
% Na+K
% SO4
% Cl
% Ca
% Mg

Table C3

Major Ion Chemistry
Canada Brick Quarry Surface Water
Location DSC

Cations

Date	Number	Calcium			Magnesium			Sodium			Potassium			Total Ions (EPM)		
		mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	Cation	Anion	
820314	1	15.00	0.75	0.45	2.70	0.22	13.23	14.00	0.61	36.26	3.90	0.10	5.94	1.68	1.74	
820813	2	262.00	13.07	0.24	55.00	4.53	8.24	835.00	36.32	66.17	38.00	0.97	1.77	54.89	55.97	
820827	3	44.00	2.20	0.70	8.80	0.72	23.03	2.70	0.12	3.73	4.20	0.11	3.42	3.14	3.66	
820924	4	70.00	3.49	0.37	18.00	1.48	15.62	98.00	4.26	44.97	9.50	0.24	2.56	9.48	9.62	
830921	5	214.00	10.68	0.25	48.00	3.95	9.11	640.00	27.84	64.20	35.00	0.90	2.06	43.36	43.44	
830922	6	208.00	10.38	0.24	48.00	3.95	9.17	640.00	27.84	64.65	35.00	0.90	2.08	43.06	38.45	
831017	7	33.00	1.65	0.46	7.20	0.59	16.42	28.00	1.22	33.76	5.90	0.15	4.18	3.61	3.46	
831018	8	38.00	1.90	0.43	13.00	1.07	24.36	28.00	1.22	27.74	8.10	0.21	4.72	4.39	3.77	
840217	9	22.10	1.10	0.34	4.60	0.38	11.59	39.00	1.70	51.96	3.40	0.09	2.66	3.26	3.05	
840218	10	35.00	1.75	0.39	11.10	0.91	20.22	37.00	1.61	35.63	9.70	0.25	5.49	4.52	3.37	*
840930	11	51.10	2.55	0.35	12.90	1.06	14.70	78.90	3.43	47.52	6.96	0.18	2.47	7.22	7.15	
841001	12	41.50	2.07	0.34	13.70	1.13	18.48	61.90	2.69	44.14	8.18	0.21	3.43	6.10	7.02	
850702	13	267.00	13.32	0.27	54.90	4.52	9.05	712.00	30.97	62.04	43.20	1.10	2.21	49.92	56.94	
850703	14	263.00	13.12	0.26	57.00	4.69	9.36	719.00	31.27	62.42	39.80	1.02	2.03	50.11	62.54	*
851005	15	42.90	2.14	0.43	9.46	0.78	15.79	42.70	1.86	37.68	5.98	0.15	3.10	4.93	4.56	
851006	16	43.90	2.19	0.44	10.50	0.86	17.49	39.70	1.73	34.95	6.25	0.16	3.24	4.94	4.63	
860618	17	73.50	3.67	0.33	21.20	1.74	15.60	129.00	5.61	50.19	6.10	0.16	1.40	11.18	11.61	
860619	18	75.00	3.74	0.32	22.50	1.85	16.07	132.00	5.74	49.84	7.20	0.18	1.60	11.52	11.39	
861008	19	84.00	4.19	37.82	18.50	1.52	13.74	114.00	4.96	44.75	16.00	0.41	3.69	11.08	11.83	
861009	20	90.00	4.49	38.54	21.50	1.77	15.18	114.00	4.96	42.55	17.00	0.43	3.73	11.65	11.90	
870403	21	67.00	3.34	31.75	20.00	1.65	15.63	124.00	5.39	51.23	5.70	0.15	1.38	10.53	11.08	
870404	22	77.00	3.84	34.17	23.00	1.89	16.83	123.00	5.35	47.57	6.30	0.16	1.43	11.25	11.60	
870625	23	91.00	4.54	32.51	30.00	2.47	17.67	150.00	6.52	46.71	17.00	0.43	3.11	13.97	13.53	
870626	24	92.00	4.59	33.06	30.00	2.47	17.77	147.00	6.39	46.04	17.00	0.43	3.13	13.89	12.94	
871008	25	183.00	9.13	32.06	42.00	3.46	12.14	343.00	14.92	52.39	38.00	0.97	3.41	28.48	26.82	
871009	26	170.00	8.48	30.24	42.00	3.46	12.32	348.00	15.14	53.97	38.00	0.97	3.47	28.05	28.28	
880831	27	143.00	7.14	34.07	42.00	3.46	16.50	228.00	9.92	47.35	17.00	0.43	2.08	20.94	21.22	
880901	28	112.00	5.59	29.15	42.00	3.46	18.03	224.00	9.74	50.82	15.00	0.38	2.00	19.17	21.22	

* Indicates that cations and anions do not lie within 10% of mean

Table C3 (cont)

Major Ion Chemistry
Canada Brick Quarry Surface Water
Location DSC

Anions

Date	Number	Chloride			Sulphate			Bicarbonate as CaCO3			Carbonate as CaCO3			Total Ions (EPM)		
		mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	Anion	Cation	
820314	1	26.00	0.73	42.04	14.00	0.29	16.71	36.00	0.72	41.25	<5.00	0.00	0.00	1.74	1.68	
820813	2	1575.00	44.43	79.37	450.00	9.37	16.74	92.00	1.84	3.29	17.00	0.34	0.61	55.97	54.89	
820827	3	38.00	1.07	29.27	61.00	1.27	34.69	66.00	1.32	36.04	<5.00	0.00	0.00	3.66	3.14	
820924	4	165.00	4.65	48.36	110.00	2.29	23.80	121.00	2.42	25.14	13.00	0.26	2.70	9.62	9.48	
830921	5	1200.00	33.85	77.92	330.00	6.87	15.82	121.00	2.42	5.57	15.00	0.30	0.69	43.44	43.36	
830922	6	1030.00	29.05	75.55	320.00	6.66	17.33	110.00	2.20	5.72	27.00	0.54	1.40	38.45	43.06	
831017	7	40.00	1.13	32.60	40.00	0.83	24.07	75.00	1.50	43.33	<5.00	0.00	0.00	3.46	3.61	
831018	8	39.00	1.10	29.16	41.00	0.85	22.63	91.00	1.82	48.22	<5.00	0.00	0.00	3.77	4.39	
840217	9	64.90	1.83	60.04	20.10	0.42	13.73	40.00	0.80	26.23	<5.00	0.00	0.00	3.05	3.26	
840218	10	68.10	1.92	57.06	19.50	0.41	12.06	52.00	1.04	30.88	<5.00	0.00	0.00	3.37	4.52	*
840930	11	140.00	3.95	55.21	54.00	1.12	15.72	104.00	2.08	29.07	<5.00	0.00	0.00	7.15	7.22	
841001	12	133.00	3.75	53.42	53.40	1.11	15.83	108.00	2.16	30.75	<5.00	0.00	0.00	7.02	6.10	
850702	13	1340.00	37.80	66.38	788.00	16.41	28.81	137.00	2.74	4.81	<5.00	0.00	0.00	56.94	49.92	
850703	14	1470.00	41.46	66.29	880.00	18.32	29.29	138.00	2.76	4.41	<5.00	0.00	0.00	62.54	50.11	*
851005	15	54.80	1.55	33.93	57.20	1.19	26.14	91.00	1.82	39.93	<5.00	0.00	0.00	4.56	4.93	
851006	16	56.60	1.60	34.49	57.30	1.19	25.77	92.00	1.84	39.74	<5.00	0.00	0.00	4.63	4.94	
860618	17	217.00	6.12	52.72	85.00	1.77	15.24	186.00	3.72	32.03	<5.00	0.00	0.00	11.61	11.18	
860619	18	213.00	6.01	52.75	78.00	1.62	14.26	188.00	3.76	33.00	<5.00	0.00	0.00	11.39	11.52	
861008	19	162.00	4.57	38.62	224.00	4.66	39.42	130.00	2.60	21.97	<5.00	0.00	0.00	11.83	11.08	
861009	20	160.00	4.51	37.92	230.00	4.79	40.24	130.00	2.60	21.84	<5.00	0.00	0.00	11.90	11.65	
870403	21	222.00	6.26	56.49	102.00	2.12	19.16	135.00	2.70	24.35	<5.00	0.00	0.00	11.08	10.53	
870404	22	233.00	6.57	56.67	105.00	2.19	18.85	142.00	2.84	24.48	<5.00	0.00	0.00	11.60	11.25	
870625	23	239.00	6.74	49.83	158.00	3.29	24.31	175.00	3.50	25.86	<5.00	0.00	0.00	13.53	13.97	
870626	24	227.00	6.40	49.47	149.00	3.10	23.97	172.00	3.44	26.57	<5.00	0.00	0.00	12.94	13.89	
871008	25	455.00	12.83	47.84	575.00	11.97	44.63	101.00	2.02	7.53	<5.00	0.00	0.00	26.82	28.48	
871009	26	455.00	12.83	45.38	646.00	13.45	47.55	100.00	2.00	7.07	<5.00	0.00	0.00	28.28	28.05	
880831	27	430.00	12.13	57.17	230.00	4.79	22.57	215.00	4.30	20.26	<5.00	0.00	0.00	21.22	20.94	
880901	28	430.00	12.13	57.17	230.00	4.79	22.57	215.00	4.30	20.26	<5.00	0.00	0.00	21.22	19.17	

* Indicates that cations and anions do not lie within 10% of mean

FIGURE 4

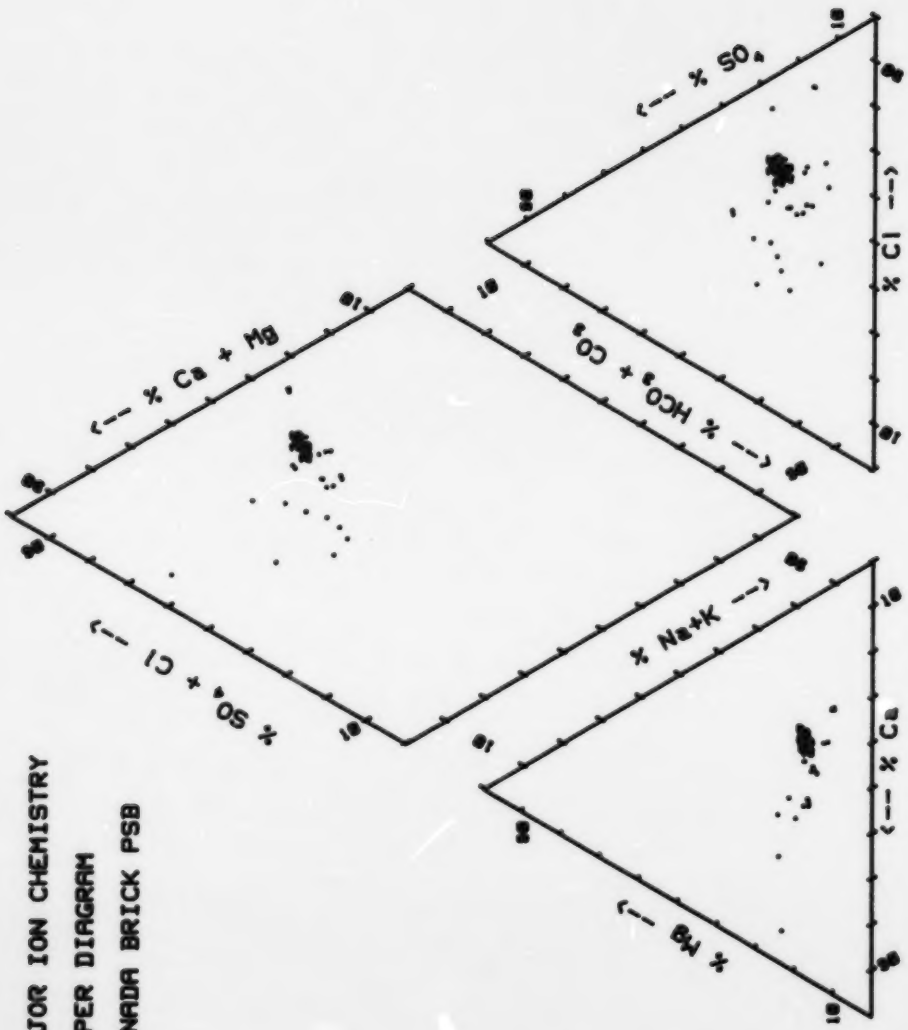

MAJOR ION CHEMISTRY
PIPER DIAGRAM
CANADA BRICK PSB
% SO4 + Cl
% Ca + Mg
% HCO3 + CO3
% Na+K
% SO4
% Cl
% Ca
% Mg

Table C4

Major Ion Chemistry
Canada Brick Quarry Surface Water
Location PSB

Cations

Date	Number	Calcium			Magnesium			Sodium			Potassium			Total Ions (EPM)		
		mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	Cation	Anion	
811130	1	58.00	2.89	0.53	16.00	1.32	23.98	26.00	1.13	20.60	5.80	0.15	2.70	5.49	5.04	
820324	2	34.00	1.70	0.45	8.10	0.67	17.59	30.00	1.30	34.45	4.70	0.12	3.17	3.79	3.63	
820813	3	97.00	4.84	0.33	22.00	1.81	12.52	173.00	7.53	52.05	11.00	0.28	1.95	14.46	14.05	
820827	4	43.00	2.15	0.70	8.70	0.72	23.19	2.70	0.12	3.81	4.20	0.11	3.48	3.09	3.60	
820924	5	70.00	3.49	0.46	18.00	1.48	19.68	55.00	2.39	31.79	6.20	0.16	2.11	7.53	10.41	*
830921	6	220.00	10.98	0.27	51.00	4.20	10.31	570.00	24.79	60.90	29.00	0.74	1.82	40.71	40.46	
830922	7	223.00	11.13	0.27	52.00	4.28	10.45	570.00	24.79	60.56	29.00	0.74	1.81	40.94	38.92	
831017	8	30.00	1.50	0.44	6.70	0.55	16.34	27.00	1.17	34.81	5.90	0.15	4.47	3.37	3.25	
831018	9	38.00	1.90	0.43	13.00	1.07	24.39	28.00	1.22	27.77	7.90	0.20	4.61	4.39	3.50	*
840217	10	22.60	1.13	0.34	4.60	0.38	11.35	40.00	1.74	52.16	3.50	0.09	2.68	3.34	3.03	
840218	11	41.00	2.05	0.41	13.00	1.07	21.43	38.00	1.65	33.12	8.70	0.22	4.46	4.99	3.39	*
840930	12	63.50	3.17	0.37	15.80	1.30	15.28	87.40	3.80	44.69	9.21	0.24	2.77	8.51	8.31	
841001	13	66.50	3.32	0.38	16.70	1.37	15.75	86.60	3.77	43.18	10.30	0.26	3.02	8.72	8.38	
850702	14	239.00	11.93	0.28	50.90	4.19	9.67	605.00	26.32	60.77	34.10	0.87	2.01	43.30	45.85	
850703	15	236.00	11.78	0.27	52.30	4.30	9.86	615.00	26.75	61.29	31.80	0.81	1.86	43.64	46.34	
851005	16	50.30	2.51	0.45	10.90	0.90	16.22	45.10	1.96	35.47	6.31	0.16	2.92	5.53	4.89	
851006	17	52.60	2.62	0.44	12.20	1.00	16.69	44.20	1.92	31.97	18.10	0.46	7.70	6.01	5.26	
860618	18	80.00	3.99	0.34	22.70	1.87	15.73	134.00	5.83	49.08	7.30	0.19	1.57	11.88	12.37	
860619	19	82.00	4.09	0.34	24.20	1.99	16.35	135.00	5.87	48.22	8.70	0.22	1.83	12.18	12.11	
861008	20	80.00	3.99	39.37	17.50	1.44	14.20	100.00	4.35	42.90	14.00	0.36	3.53	10.14	10.54	
861009	21	80.00	3.99	38.25	19.00	1.56	14.98	104.00	4.52	43.34	14.00	0.36	3.43	10.44	10.89	
870403	22	69.00	3.44	32.12	20.00	1.65	15.35	126.00	5.48	51.12	5.90	0.15	1.41	10.72	11.04	
870404	23	75.00	3.74	32.92	22.00	1.81	15.92	130.00	5.65	49.74	6.30	0.16	1.42	11.37	11.63	
870625	24	100.00	4.99	35.03	30.00	2.47	17.33	146.00	6.35	44.58	17.00	0.43	3.05	14.24	13.63	
870626	25	98.00	4.89	34.90	30.00	2.47	17.62	143.00	6.22	44.39	17.00	0.43	3.10	14.01	13.47	
871008	26	126.00	6.29	29.97	45.00	3.70	17.65	242.00	10.53	50.18	18.00	0.46	2.19	20.98	20.78	
871009	27	117.00	5.84	28.56	45.00	3.70	18.12	240.00	10.44	51.07	18.00	0.46	2.25	20.44	20.13	
880831	28	130.00	6.49	32.19	41.00	3.37	16.74	226.00	9.83	48.78	18.00	0.46	2.28	20.15	21.07	
880901	29	118.00	5.89	30.87	41.00	3.37	17.69	215.00	9.35	49.03	18.00	0.46	2.41	19.07	21.59	

* Indicates that cations and anions do not lie within 10% of mean

Table C4 (cont)

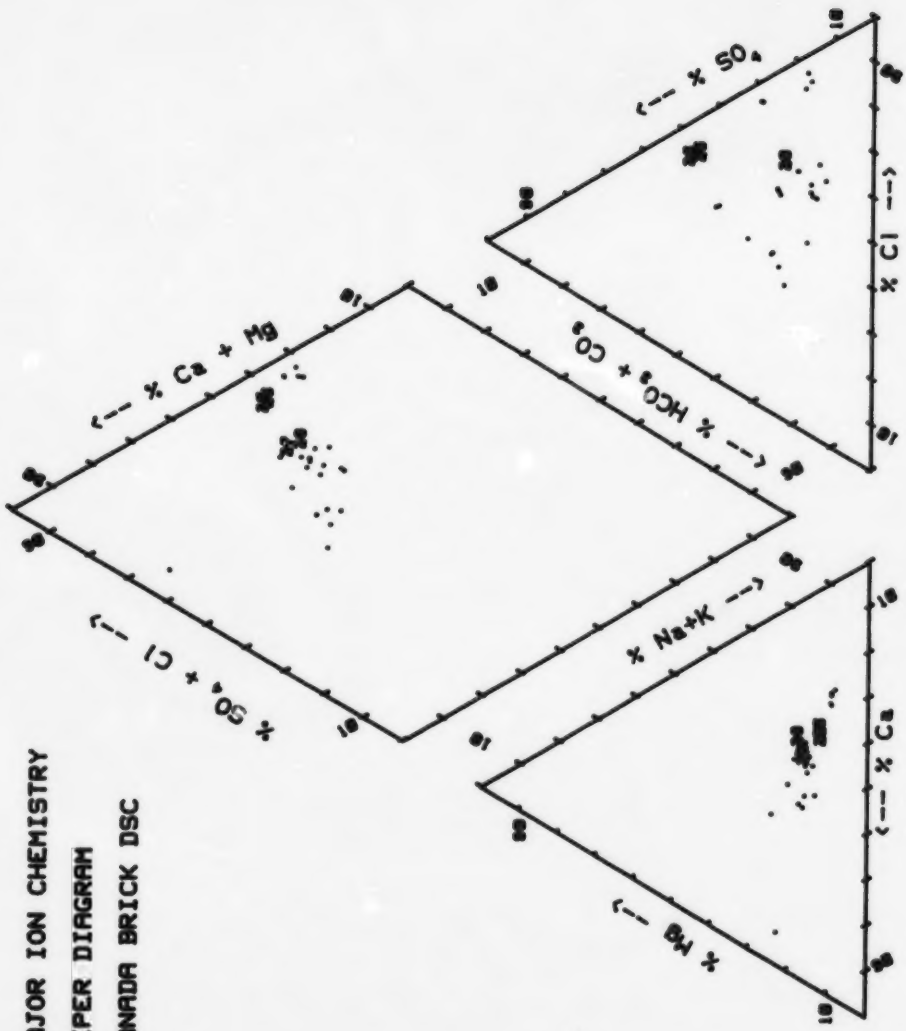
Major Ion Chemistry
Canada Brick Quarry Surface Water
Location PSB

Anions

Date	Number	Chloride			Sulphate			Bicarbonate as CaCO3			Carbonate as CaCO3			Total Ions (EPM)	
		mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	mg/L	EPM	%EPM	Anion	Cation
811130	1	46.00	1.30	25.76	74.00	1.54	30.59	110.00	2.20	43.66	0.00	0.00	0.00	5.04	5.49
820324	2	50.00	1.41	38.86	24.00	0.50	13.77	86.00	1.72	47.37	<5.00	0.00	0.00	3.63	3.79
820813	3	242.00	6.83	48.59	175.00	3.64	25.94	160.00	3.20	22.77	19.00	0.38	2.70	14.05	14.46
820827	4	38.00	1.07	29.78	59.00	1.23	34.12	65.00	1.30	36.10	<5.00	0.00	0.00	3.60	3.09
820924	5	165.00	4.65	44.72	140.00	2.91	28.01	133.00	2.66	25.55	9.00	0.18	1.73	10.41	7.53 *
830921	6	1100.00	31.03	76.69	310.00	6.45	15.95	127.00	2.54	6.28	22.00	0.44	1.09	40.46	40.71
830922	7	1060.00	29.90	76.83	290.00	6.04	15.52	122.00	2.44	6.27	27.00	0.54	1.39	38.92	40.94
831017	8	36.00	1.02	31.28	38.00	0.79	24.37	72.00	1.44	44.34	<5.00	0.00	0.00	3.25	3.37
831018	9	35.00	0.99	28.23	37.00	0.77	22.03	87.00	1.74	49.74	<5.00	0.00	0.00	3.50	4.39 *
840217	10	65.40	1.84	60.85	18.60	0.39	12.77	40.00	0.80	26.38	<5.00	0.00	0.00	3.03	3.34
840218	11	66.70	1.88	55.55	19.50	0.41	11.99	55.00	1.10	32.46	<5.00	0.00	0.00	3.39	4.99 *
840930	12	140.00	3.95	47.53	74.00	1.54	18.54	129.00	2.58	31.04	12.00	0.24	2.89	8.31	8.51
841001	13	138.00	3.89	46.46	81.00	1.69	20.13	140.00	2.80	33.41	<5.00	0.00	0.00	8.38	8.72
850702	14	1070.00	30.18	65.82	599.00	12.47	27.20	160.00	3.20	6.98	<5.00	0.00	0.00	45.85	43.30
850703	15	1080.00	30.46	65.74	608.00	12.66	27.32	161.00	3.22	6.95	<5.00	0.00	0.00	46.34	43.64
851005	16	62.30	1.76	35.91	64.20	1.34	27.32	90.00	1.80	36.77	<5.00	0.00	0.00	4.89	5.53
851006	17	63.10	1.78	33.85	64.30	1.34	25.46	107.00	2.14	40.69	<5.00	0.00	0.00	5.26	6.01
860618	18	217.00	6.12	49.50	105.00	2.19	17.68	203.00	4.06	32.82	<5.00	0.00	0.00	12.37	11.88
860619	19	214.00	6.04	49.83	95.00	1.98	16.33	205.00	4.10	33.84	<5.00	0.00	0.00	12.11	12.18
861008	20	142.00	4.01	38.01	186.00	3.87	36.75	133.00	2.66	25.23	<5.00	0.00	0.00	10.54	10.14
861009	21	150.00	4.23	38.86	193.00	4.02	36.91	132.00	2.64	24.24	<5.00	0.00	0.00	10.89	10.44
870403	22	222.00	6.26	56.72	96.00	2.00	18.11	139.00	2.78	25.17	<5.00	0.00	0.00	11.04	10.72
870404	23	240.00	6.77	58.21	98.00	2.04	17.55	141.00	2.82	24.24	<5.00	0.00	0.00	11.63	11.37
870625	24	228.00	6.43	47.20	142.00	2.96	21.70	212.00	4.24	31.10	<5.00	0.00	0.00	13.63	14.24
870626	25	223.00	6.29	46.71	145.00	3.02	22.42	208.00	4.16	30.88	<5.00	0.00	0.00	13.47	14.01
871008	26	397.00	11.20	53.90	268.00	5.58	26.86	200.00	4.00	19.25	<5.00	0.00	0.00	20.78	20.98
871009	27	397.00	11.20	55.63	237.00	4.93	24.51	200.00	4.00	19.86	<5.00	0.00	0.00	20.13	20.44
880831	28	405.00	11.42	54.22	230.00	4.79	22.73	243.00	4.86	23.06	<5.00	0.00	0.00	21.07	20.15
880901	29	400.00	11.28	52.25	260.00	5.41	25.07	245.00	4.90	22.68	<5.00	0.00	0.00	21.59	19.07

* Indicates that cations and anions do not lie within 10% of mean

FIGURE 5


MAJOR ION CHEMISTRY
PIPER DIAGRAM
CANADA BRICK DSC
% SO4 + Cl -->
<-- % Ca + Mg
% HCO3 + CO3 -->
<-- % SO4
% Cl -->
% Na+K -->
<-- % Ca
<-- % Mg

APPENDIX D

CANADA BRICK QUARRY
SURFACE WATER SURVEY
(MARY FIX CREEK)

TIME TREND PLOTS FOR
SELECTED PARAMETERS

Figure D1 Bicarbonate Alkalinity

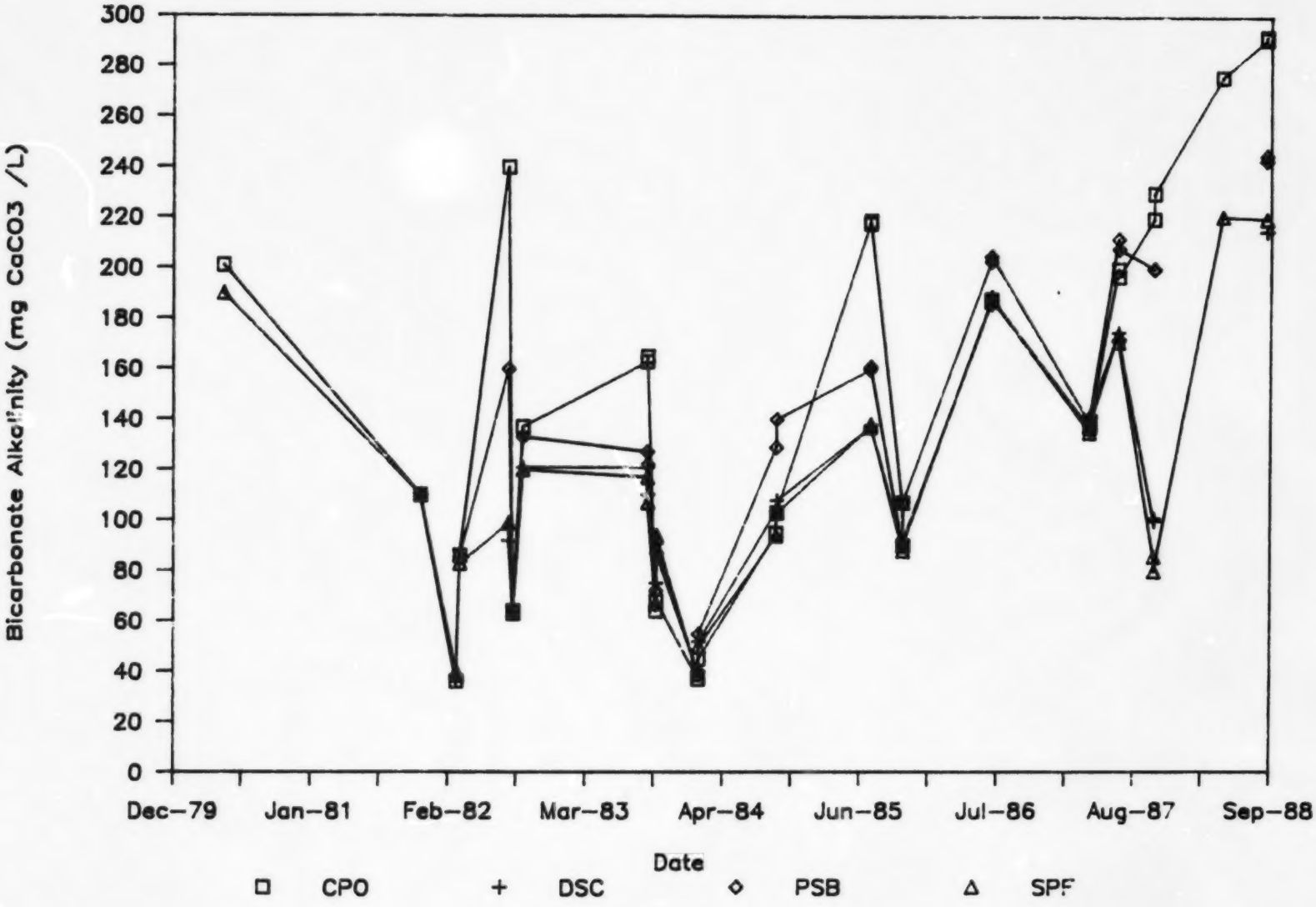


Figure D2 pH

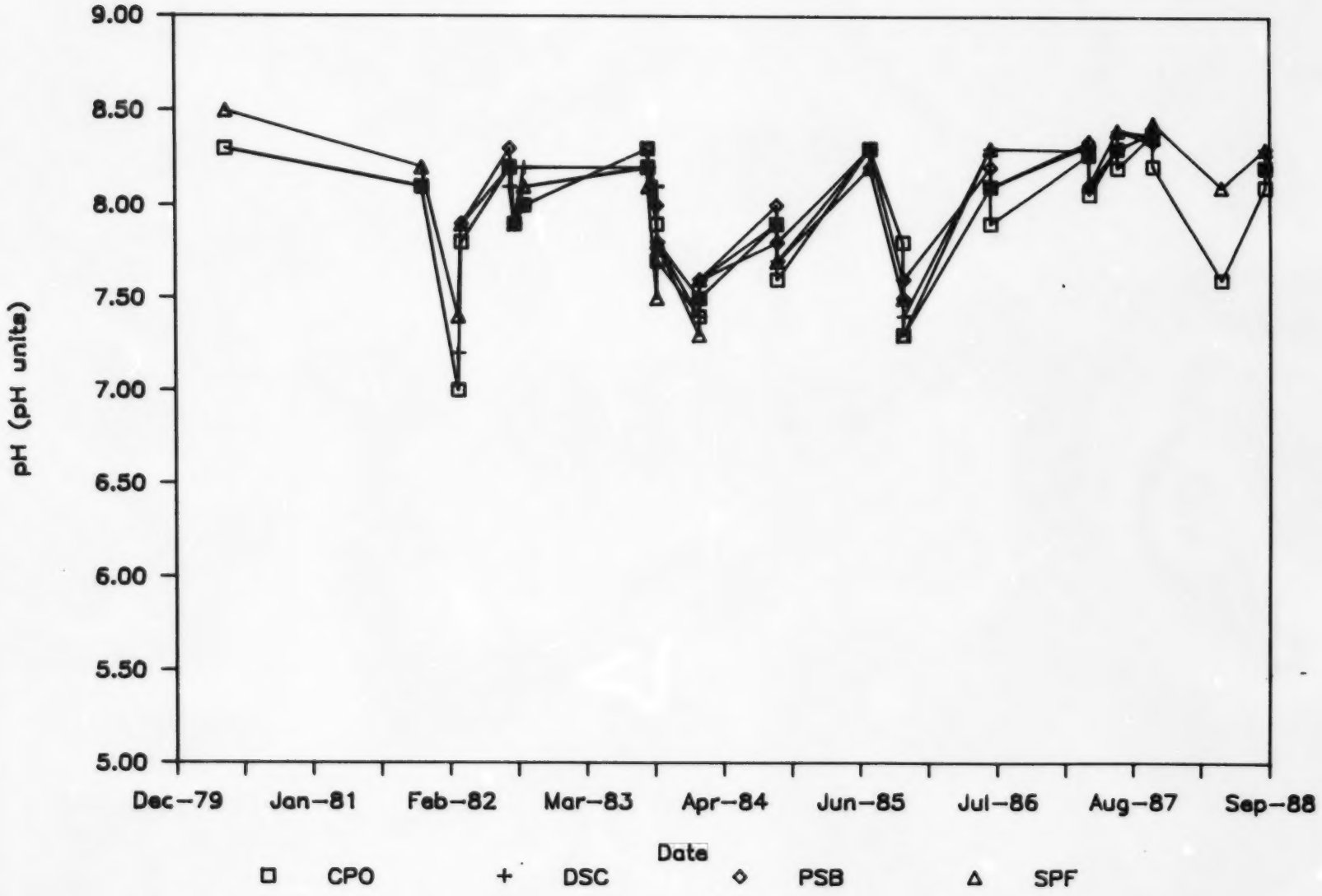

9.00
8.50
8.00
7.50
7.00
6.50
6.00
5.50
5.00
pH (pH units)
Dec-79
Jan-81
Feb-82
Mar-83
Apr-84
Jun-85
Jul-86
Aug-87
Sep-88
Date
CPO
DSC
PSB
SPF

Figure D3 Boron

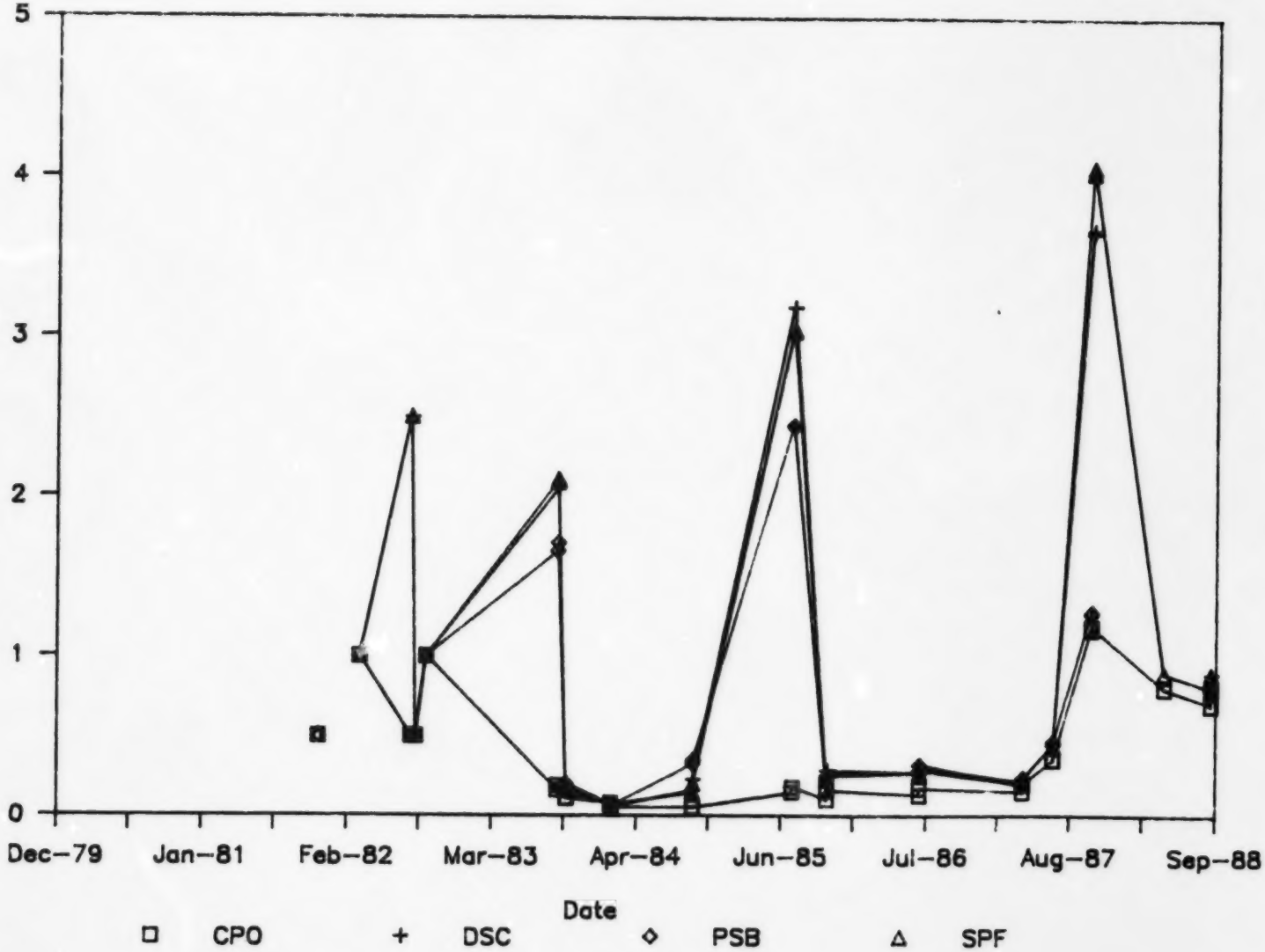


Figure D4 Strontium

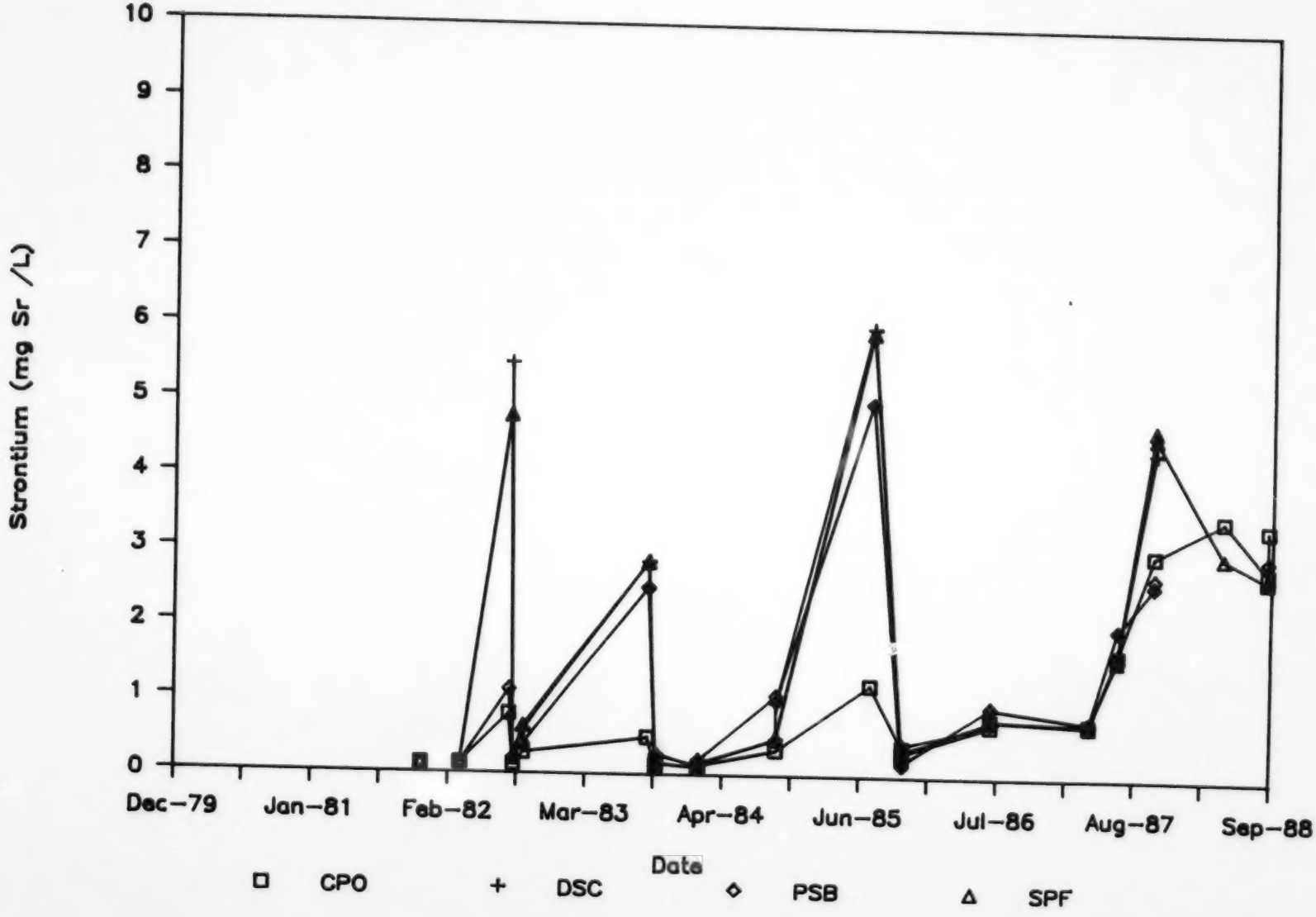


Figure D5 Sodium

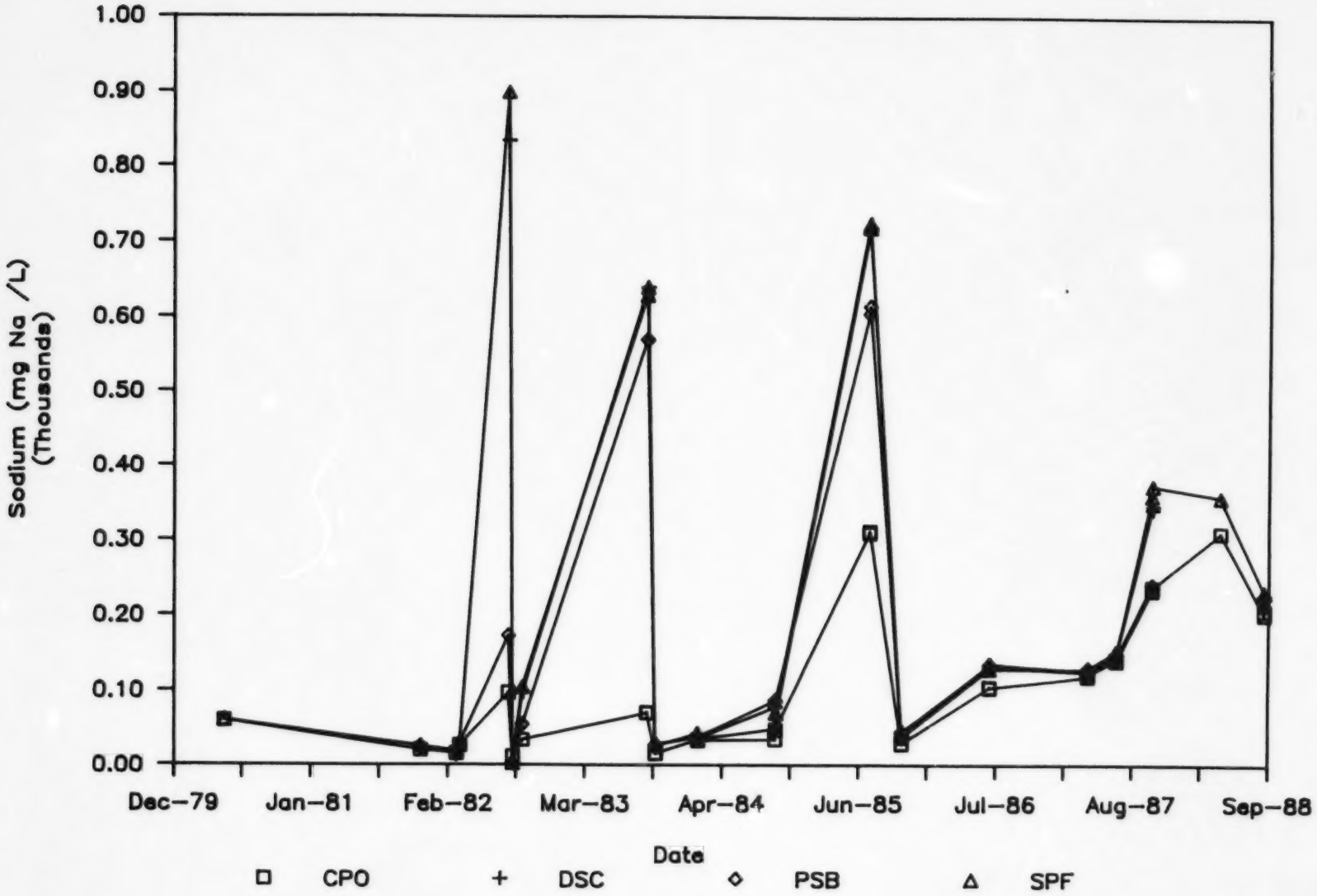


Figure D6 Chloride

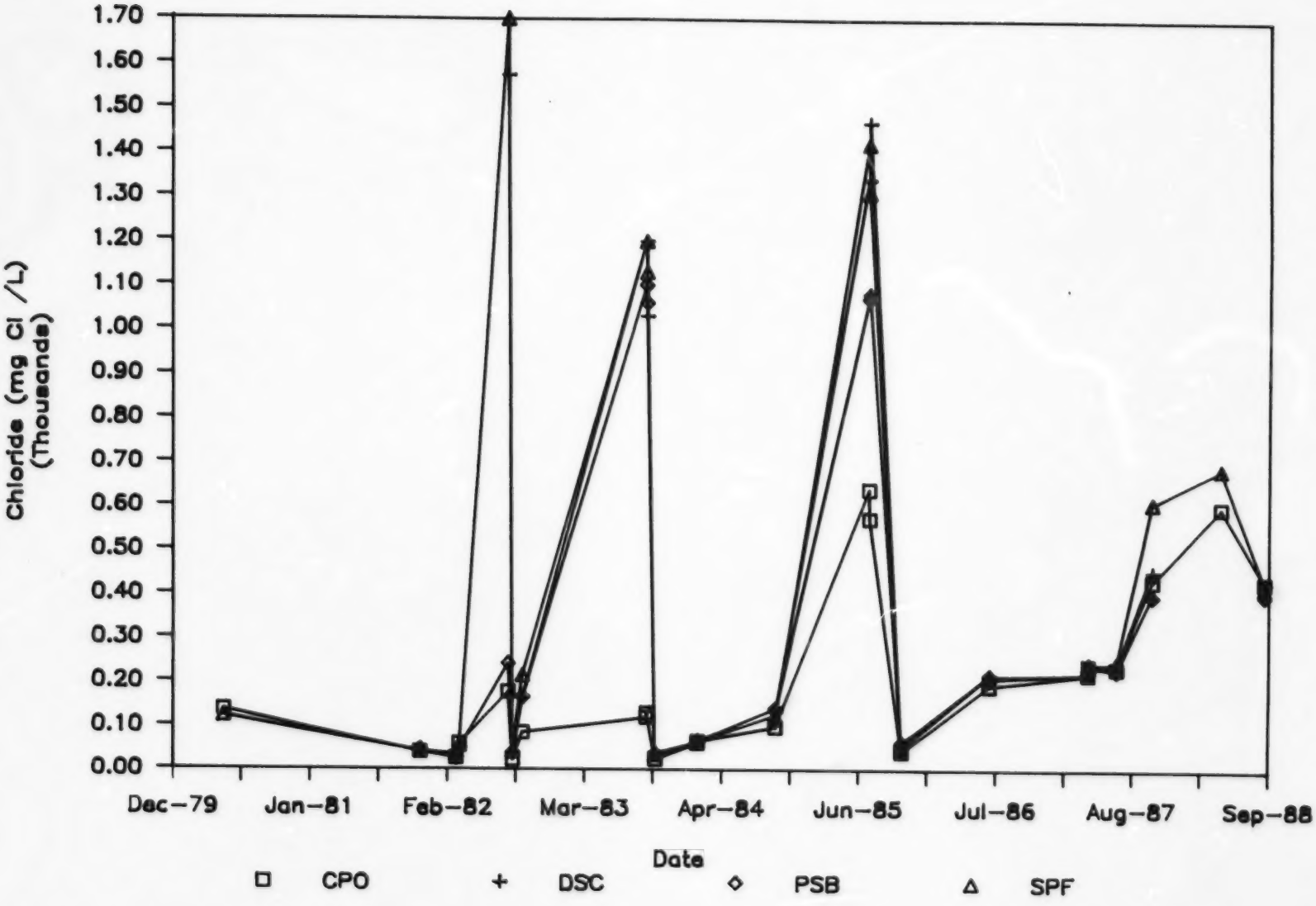


Figure D7 Calcium

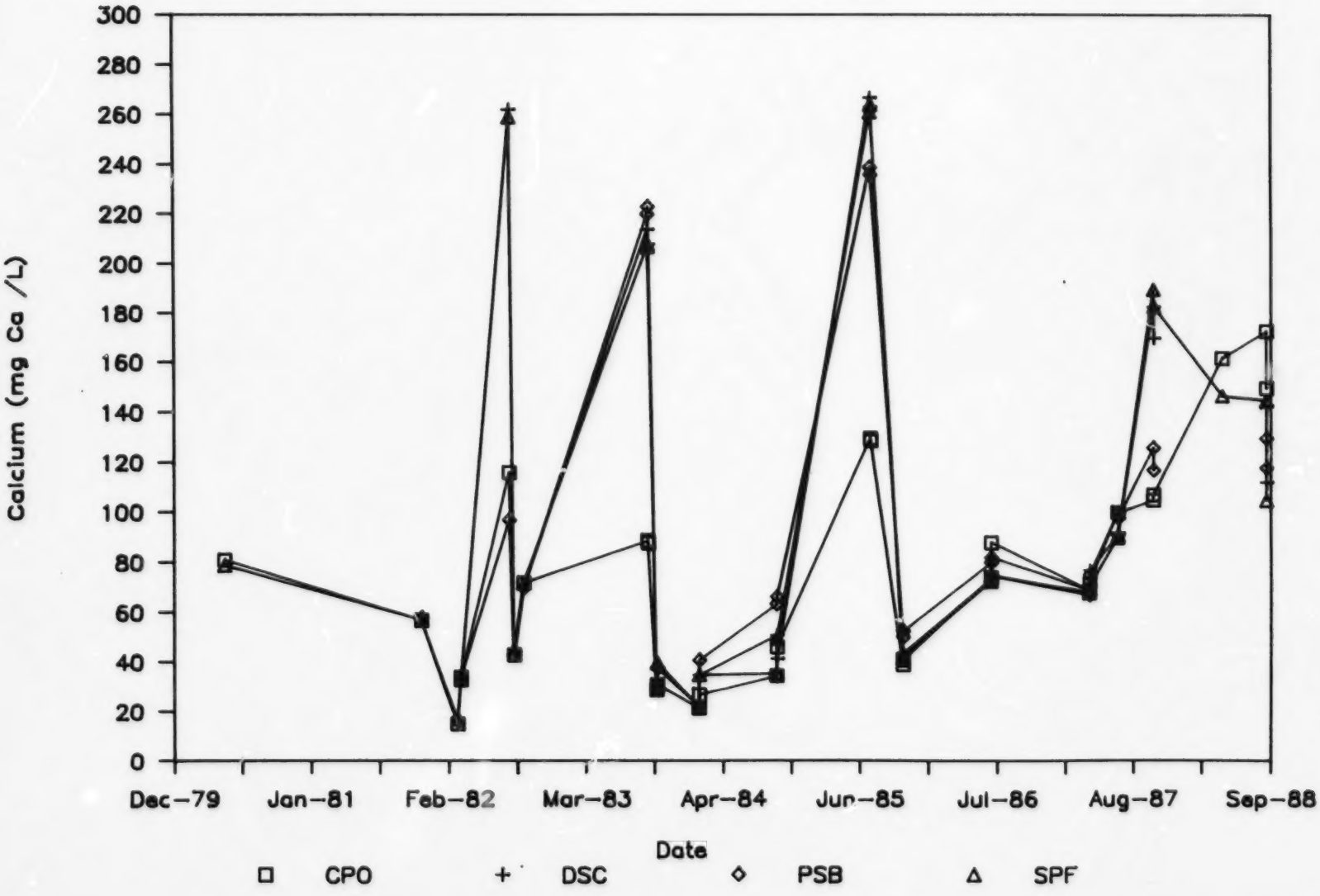


Figure D8 Sulphate